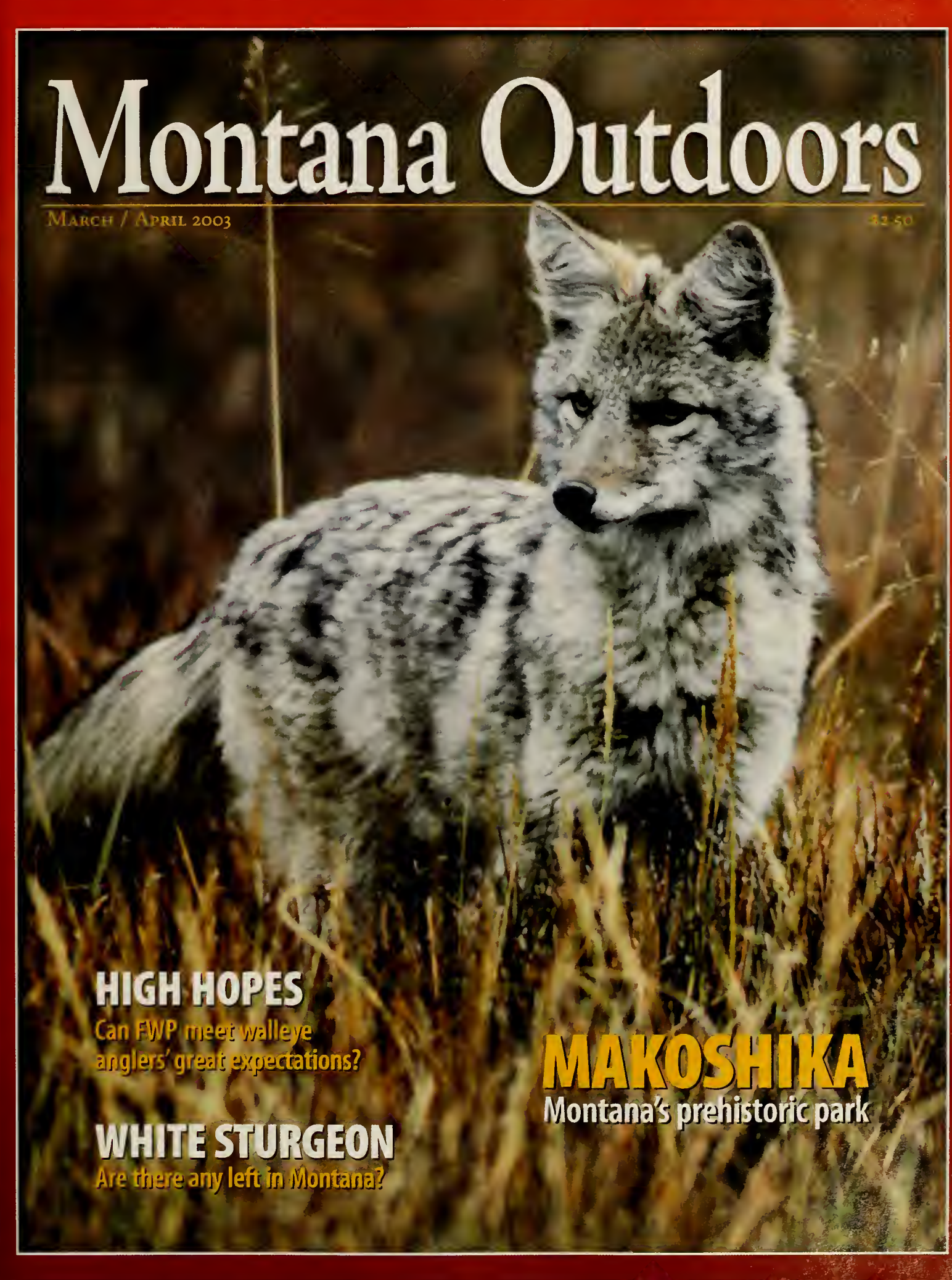
Montana Outdoors

March / April 2003

$2.50



HIGH HOPES

Can FWP meet walleye anglers' great expectations?

WHITE STURGEON

Are there any left in Montana?

MAKOSHIKA

Montana's prehistoric park

WHOA! A skittish Pryor Mountain mustang stands still long enough for photographer Gary Beeler to trip the shutter. To learn about Montana's remnant wild horse herd, see our story on page 32.

Montana Fish, Wildlife & Parks

STATE OF MONTANA
Judy Martz, Governor

MONTANA FISH, WILDLIFE & PARKS COMMISSION
Dan Walker, Chairman
Tim Mulligan, Vice-Chairman
John Lane
Mike Murphy
John Brenden

M. Jeff Hagener, Director
Chris Smith, Chief of Staff
Larry Peterman, Chief of Operations
Dan Ellison, Chief of Administration and Finance

CONSERVATION EDUCATION DIVISION
Ron Aasheim, Administrator

MAGAZINE STAFF
Tom Dickson, Editor
Luke Duran, Art Director
Debbie Sternberg, Circulation Manager
Dave Books, Editor Emeritus

Montana Outdoors (ISSN 0027-0016) is published bimonthly by Montana Fish, Wildlife & Parks. Subscription rates are $9 for one year, $16 for two years, and $22 for three years. (Please add $3 per year for Canadian subscriptions. All other foreign subscriptions, air-mail only, are $25 for one year.) Individual copies and back issues cost $3.50 each (includes postage). Although *Montana Outdoors* is copyrighted, permission to reprint articles is available by writing our office or phoning us at (406) 495-3257. All correspondence should be addressed: *Montana Outdoors*, Montana Fish, Wildlife & Parks, 930 West Custer Avenue, P.O. Box 200701, Helena, MT 59620-0701; or e-mail at montanaoutdoors@state.mt.us. Our website address is fwp.state.mt.us.

© Montana Fish, Wildlife & Parks, 2003. All rights reserved.

For address changes or other subscription information, call
800-678-6668

POSTMASTER: Send address changes to *Montana Outdaars*, Montana Fish, Wildlife & Parks, 930 West Custer Ave., P.O. Box 200701; Helena, MT S9620-0701. Preferred periodicals postage paid at Helena, MT 59620, and additional mailing offices.

Montana Outdoors

Volume 34, Number 2

Montana Outdoors

March/April 2003

Features

6 Great Expectations
Warmwater anglers have high hopes for the state's walleye fishing. Too high? *By Tom Dickson*

12 A Good Time in Montana's Badlands
Makoshika State Park provides a recreational feast in some of the state's strangest surroundings. *By Brett French*

18 Barely Afloat
As Montana's white sturgeon population sinks, biologists race against time to keep the majestic fish from disappearing altogether. *By Ray Stout*

23 Full-Contact Birding
Bird watching: Have you got what it takes? *By Matt Flavin. Illustrations by Jeff Tolbert*

26 A Dam Improvement
It seemed impossible for trout anglers and hydropower facility owners to ever see eye to eye. Then came the Clark Fork Settlement Agreement...*By John Fraley and Joe DosSantos*

32 A Mustang Sally
Head for the Pryor Mountains to see wild descendents of Spanish horses brought here five centuries ago. *By Gary Beeler*

BILL CARTER

Departments

2 LETTERS

3 NATURAL WONDERS

3 OUR POINT OF VIEW:
A Passion for Hunting and Fishing

4 OUTDOORS REPORT

37 OUTDOORS PORTRAIT:
Ponderosa Pine

38 PARTING SHOT
National wildlife refuges celebrate 100 years of protection and management

COVER PHOTO: Though found throughout Montana, coyotes are identified most with our eastern prairies and badlands. The clever canine is just one of many wildlife species seen at Makoshika State Park, featured on page 12. Photo by Bill Priest.

Fellow centrist

I want to compliment FWP Director Jeff Hagener on his Point of View piece ("Hardly Extreme") in the Jul./Aug. issue of *Montana Outdoors*. I cannot begin to emphasize how much the theme in his column rings true to me. Working in Washington, D.C., I am all too familiar with the "blame game" between rival factions.

Director Hagener's centrist response to controversial conservation issues is right on target. New research makes a compelling case that partisan and rhetorical approaches alienate Americans and simply do not work to improve conservation policy.

Both he and I are at that sensible center of conservation policymaking, which is the only place where durable policies are ever made.

Paul W. Hansen
Executive Director
The Izaak Walton League of America
Washington, D.C.

Why we hunt

The "Heart of the Hunt" article by Thomas Baumeister (Nov./Dec., 2002) strongly resonated with me. I agree with the author that those of us who hunt struggle to find the right words to explain to nonhunters what motivates our strong desire to get into the woods and fields with a rifle, bow, or shotgun each fall. I have faced this exact scenario trying to explain to my intellectual, nonhunting father-in-law why a well-educated, civilized person would "kill animals for sport." Due to the declining numbers of hunters in the United States and the growing anti-hunting sentiment in our country, Mr. Baumeister builds a strong case for why it is important to communicate better to the nonhunting world. Thanks for helping us

Heart of the hunt

WHY HUNTERS MIGHT WANT TO RECONSIDER HOW THEY EXPLAIN THEMSELVES TO OTHERS

better understand the importance of understanding and communicating why we hunt.

Doug Fletcher
Belgrade

I enjoyed Thomas Baumeister's article "Heart of the Hunt." He made a very good point that it's important for hunters to use more than utilitarian arguments to express why they hunt. Yet his three explanations of hunting's appeal ("tradition, interaction with nature, and self-reliance") still felt a little hollow to me. It reminded me a bit of a psychologist explaining away faith. Many hunters I know hunt simply because there is something in it that feeds the soul. Aldo Leopold expressed this well in his essay "Goose Music" from *A Sand County Almanac*: "To those whose hearts are stirred by the sound of whistling wings and quacking mallards, wildlife is something even more than [a social asset]. It is not merely an acquired taste; the instinct that finds delight in the sight and pursuit of game is bred into the very fiber of the race. Babes do not tremble when they are shown a golf ball, but I should not like to own the boy whose hair does not lift his hat when he sees his first deer. We are dealing, therefore, with something that lies very deep."

Yes, deep within the human spirit, I would say.

Shauna Hanisch
U.S. Fish and Wildlife Service
Arlington, VA

Who really pays?

In the Sept./Oct. issue you published a letter from a riparian landowner who lamented that he pays taxes on a river bottom while recreationists enjoy it.

He might also have noted that agriculture is one of the largest recipients of "corporate welfare" such as subsidies, cash payments, and so on. It's the recreationists and other taxpayers, of course, who pony up for all this largesse.

But with respect to rivers, the unkindest cut of all is that the state gives away for the asking one of its most precious commodities—water. Rivers throughout Montana are severely impacted even in the good water years by withdrawls for, among other things, irrigation, stock water, and other agricultural uses. And we all pay for this charity. Fish and wildlife populations suffer, water quality is compromised, recreation use is impaired, wetlands are dried up, and so forth.

Duane E. Phinney
St. Regis

Goldeneye eagle eye

In Tom Dickson's portrait of the common goldeneye (Nov./Dec.), the author writes, "The common goldeneye doesn't breed in Montana but rather migrates through." If he would have bothered to check the Montana Bird Distribution of Montana Birds, it would have been noted that the common goldeneye is a breeding species. A further and more informative check of P. D. Skaar's 1996 *Montana Bird Distribution* book shows there has been direct evidence of common goldeneye in 10 or 20 percent of the latilong bird distribution mapping units for the state.

Ken Walcheck
Bozeman

EDITOR REPLIES: *Thanks for alerting readers to these two great bird references. Actually, I did check Skaar's Montana Bird Distribution via the Montana Bird Distribution Database, managed*

Continued on page 36

TOM DICKSON

"Harold does miss his ice fishing."

Q. *If both male and female mountain goats have horns, how do you tell them apart?*

A. According to Gayle Joslin, Helena area wildlife biologist, there are several ways. "Usually if they are in a group, they are females," she says. "Males tend to either be alone or with one other male, except during the November mating season, when they gather with females."

Another way is to watch how they urinate. The male goat stretches forward with his front legs, while keeping the back ones stationary. The female, on the other hand, stands in place and then squars.

ILLUSTRATIONS BY JEFF TOLBERT

Q. *What causes a chinook wind?*

A. Chinook is an American Indian word for "snow eater." These warm winter winds that slide along the Rocky Mounrain Front begin over the Pacific Ocean. The warm, moist air mass moves east up over the Rockies and cools, causing the moisture to condense and fall as snow or rain. Condensation generates heat, and air warms as it moves downhill, so the winds that roar down the east side of the mountain can be 30 degrees or more warmer than they were at the same elevation on the west side.

Q. *I've read that the glaciers in Glacier National Park are disappearing. Is that true?*

A. It is, according to Dan Fagre, a U.S. Geological Service research scientist. Fagre says that in 1850 the park had 150 glaciers, while today fewer than 37 remain. And many of those are shrinking rapidly. For example, Grinnell Glacier has lost 35 acres in the past seven years. Fagre says the loss is certainly due to global warming, "but it's hard to say to what extent humans are contributing to the warming."

? *Wonder about some part of Montana's natural world? E-mail us at: tdickson@state.mt.us*

OUR POINT OF VIEW

JEFF HAGENER | *Director of Montana Fish, Wildlife & Parks*

At the many public meetings across the state I attend each year, I'm often asked about my background in the outdoors. Probably the most common question is whether I hunt and fish.

The answer is an unqualified "Yes." In fact, after my family, hunting and fishing are the main passions of my life. And when I can combine them with my family, like when I took my son antelope and deer hunting this past fall, then I'm as happy as a guy can get.

Hunting and fishing have been a huge part of my life going all the way back to when I was a boy, growing up in Havre. My dad would take my brothers and me on deer or bird hunts, or we'd fish the Milk River, Beaver Creek, or Fresno Reservoir. In the fall we'd start hunting the first day of bird season and be out pretty much every weekend and many evenings.

All through high school and into college, I continued to hunt and fish. While in college and for a few years afterward, I worked as a hunting guide and packer for an outfitter in the Bob Marshall Wilderness. I learned a lot about hunting and wildlife during that time from old-timers and applied that knowledge later on. I have been fortunate to take some truly big bulls over the years and even a bighorn ram in the Sun River area. I also like hunting waterfowl, and in recent years I've been having a great time calling in gobblers during the spring turkey season around Miles City. I've called in 900-pound bull elk and 20-pound wild turkeys, and to tell you the truth I can't say which is more exciting.

Montana Fish, Wildlife & Parks

As for fishing, I've gone after everything from trout to ling. I've had some truly memorable cutthroat fishing trips, some incredible late spring days jigging for trout on Canyon Ferry Reservoir, and I've also been fortunate to catch some massive paddlefish in the Missouri River. My dad didn't discriminate when it came to fishing. He just tried to catch whatever was biting, and I'm the same way.

I'm 48, and one thing I've noticed after nearly four decades of hunting and fishing is that I'm becoming less concerned with filling my limit or bagging a trophy. I'm more interested these days in the ambiance of the outing, learning the habits of fish and wildlife, and the camaraderie of hunting camp or a day with friends along a stream.

When I was a boy, it was great to spend time with my dad, but I didn't really understand the importance of that time together until recently. Now, when I see my son get his first antelope or take a nice mule deer that he worked so hard to hunt, I feel such a strong emotion that I can hardly talk about it without misting up a bit.

So yes, I hunt and fish. But even more importantly, my son does too.

M. Jeff Hagener

State park visitors spend more than $100 million in local Montana communities

DONNIE SEXTON/TRAVEL MONTANA

State park visitors, like these cyclists at Giant Springs, spend on average $30 to $61 per group per day in nearby communities.

They come to camp, picnic, hike, fish, and learn about American Indian culture and Montana history. But state park visitors don't just spend time enjoying Montana's 42 state parks; they also spend money in nearby towns. Lots of money.

According to a recent University of Montana survey, state park visitors spend $116 million in local Montana communities each year. Most of that money goes into the tills of small-town restaurants, gas stations, bars, motels, and campgrounds. For many Montana communities—especially those with few other tourist attractions—a state park can be an economic lynchpin.

Linda Koncilya, executive director of the Glendive Chamber of Commerce and Agriculture, calls nearby Makoshika State Park a "huge draw." She explains that in summer, carloads of families stream past the town on I-94 each day heading west to the Rockies.

"Many choose to stay in Glendive a day or two because of the state park," she says. "If it weren't for Makoshika, I think they'd just drive on past."

Even towns with other tourist amenities value the economic boost a state park provides. Judy Siring, executive director for the Beaverhead Chamber of Commerce, says Bannack State Park is "just huge" when it comes to drawing visitors to Dillon and surrounding towns. Though the Dillon area is nationally known for nearby blue-ribbon trout waters and sits near a major route to Glacier National Park, Siring says many town businesses also depend on Bannack.

"We get a lot of people who come through here just to visit the park," she says. "It's especially busy in July with Bannack Days, when we'll get 8,000 to 10,000 people. You can't imagine how important that is to the restaurants, motels, and tourist shops around here."

Conducted for Montana FWP by the University of Montana Bureau of Business and Economic Research, the random telephone survey was carried out in the summer of 2002.

Researchers also found that nonresidents spend roughly twice that of residents in local communities during park visits ($61 per group per day versus $30 per group per day).

"The survey verifies what we've known for years," says Doug Monger, administrator of FWP's Parks Division. "State parks attract a lot of money into local economies, and that's true across Montana."

JEFF HENRY / ROCHEJAUNE PHOTOS

Montana's state color: BLAZE ORANGE?

According to a new survey released by the U.S. Fish and Wildlife Service, more Montanans go hunting, per capita, than residents of any other state. Nearly one-quarter (24 percent) of adult Montanans pursue game animals each fall. The closest other states are North Dakota, Wyoming, and West Virginia with participation rates of 19, 17, and 17 percent respectively.

The survey also showed that Montana ranked among the top five states in per capita participation for fishing and wildlife watching.

Zap goes the mayfly

Electric bug zappers kill far more beneficial insects such as mayflies, caddis flies, and moths than mosquitoes, according to a recent article by a research associate at the Smithsonian Institute. Dr. Arthur Evans reports that Americans buy roughly one million bug zappers each year hoping to kill pesky mosquitoes. "Yet studies show that 95 percent of the species killed are nonbiting, mostly beneficial insects," Evans writes. "Researchers estimate that 71 billion to 350 billion beneficial insects, pollinators and insect predators among them, are killed annually by bug zappers across the country."

MICHAEL H. FRANCIS

Not available in bookstores anywhere

GARYBEELER.COM

The new textbook covers the Crown of the Continent ecosystem, which runs from central British Columbia to west-central Montana.

The Blackfeet Indians call it *Miistakis*, or "backbone of the world." Scientists refer to it as the Crown of the Continent ecosystem. Whatever its name, this spectacular region of the Rocky Mountains—from central British Columbia in the north to Montana's Blackfoot River valley in the south—encompasses important geology, wildlife, wilderness, and sacred sites for American Indians.

Readers interested in learning more about the region are well served by a new book published by a consortium of conservation educators. Written by Ben Long, a Kalispell freelance writer, *Crown of the Continent: Profile of a Treasured Landscape* explores the natural environment, history, and culture of the vast ecosystem extending north and south from Glacier National Park. The book is being used as a reference by students from middle school to college, as well as by other interested citizens.

Founded in 1995, the Crown of the Continent Ecosystem Education Consortium works to present local ecological information in a broader ecosystem-wide context. Participants include the Boone and Crockett Conservation Education Program, Montana FWP, The Nature Conservancy, and two dozen other public and private conservation and education organizations.

"We want this book to serve as a ready source of information about the Crown of the Continent ecosystem," says Lex Blood, co-founder of The Glacier Institute and the consortium's coordinator. "We're hoping it becomes the basis for ecosystem-based educational activities and projects throughout the region."

The book sells for $28, plus shipping and handling. To order, call (800) 375-7645.

Can preparing good food help conserve Montana's parks, wildlife, and fish? It can when the recipes come from a new fund-raising cookbook, published to support the Montana Fish, Wildlife & Parks Foundation. *The Magic That is Montana: An FWP Cookbook* contains 225 recipes, ranging from appealing appetizers such as Dill Weed Dip to decadent desserts like Bubba's Bourbon Cake. The cookbook is filled with kitchen standards, such as recipes for cornbread, sloppy Joes, and oatmeal chocolate chip cookies, but it also contains several surprises developed or passed on by Montana FWP staff members. Such recipes as the Ultimate Nanaimo Bar, Lebanese Burgers, and Kadia's "Sure-to-make-you-feel-better" Potato Soup will stir the curiosity of anyone who enjoys preparing food.

MONTANA FWP

The FWP cookbook offers more than 200 recipes for conservation.

The cookbook also contains a hefty fish and game section with dishes such as Pheasant Pierre, Lake Whitefish Almondine, and Walleye Decadence.

Proceeds from the cookbook will help fund projects such as the Montana Wildlife Rehabilitation Center in Helena.

To order a copy, send a check or money order for $12.95 (includes shipping and handling) to Montana Fish, Wildlife & Parks, Attn: Cookbooks, P.O. Box 200701, 1420 East Sixth Avenue, Helena, MT 59620.

Continued on page 36

SAVING WATER ON THE JEFFERSON

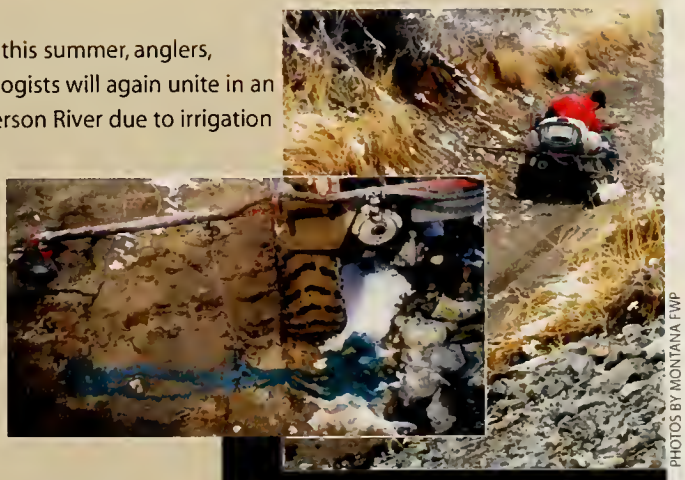
If the prolonged drought continues this summer, anglers, landowners, and Montana FWP biologists will again unite in an effort to reduce water loss in the Jefferson River due to irrigation canal inefficiencies.

"A significant amount of water gets lost from the four main canals due to seepage and evaporation," says Ron Spoon, area fisheries biologist.

In the spring of 2002, Trout Unlimited and FWP's Future Fisheries Program paid $2,700 to ditch companies to line two canals with a temporary ditch sealant, which greatly reduced leakage.

In return, the irrigators agreed to leave the "saved" water in the Jefferson for trout.

"Paying for the cost of improving canal efficiency is one way anglers can help irrigators who voluntarily contribute water to the Jefferson," says Spoon.



PHOTOS BY MONTANA FWP

A contractor sprays liquid sealant into one of two irrigation canals off the Jefferson River near Whitehall. The next day, water was released into the canal, mixing with the sealant and soil to form a slurry that coated the channel and reduced seepage loss throughout 2002.

RON BOGGS

Warmwater anglers have high hopes for the state's walleye fishing. Too high?

Great Expectations

BY TOM DICKSON

Chuck Lawson of Glasgow dreams of the day when Fort Peck Reservoir, the sprawling Missouri River impoundment in northeastern Montana, produces world-class walleye fishing. The energetic tournament angler envisions Glasgow as a walleye fishing mecca, where local boat dealerships throng with customers, tournament anglers fill local restaurants, and families from across the United States arrive daily for their walleye fishing vacation.

"This lake could produce excellent fishing like they've got in Lake Erie, [North Dakota's Lake] Sakakawea, and other great walleye lakes around the country," says Lawson. "But the past couple of years, the fishing has been crummy."

He's not the only one hoping for better walleye fishing. Across the state, warmwater anglers continue to press Montana Fish, Wildlife & Parks to find new ways to produce more of their favorite fish, an equally tasty but much larger cousin to the perch and sauger. Fueling their hopes are national fishing magazines, TV shows, and Internet sites, which report on the nation's best walleye fishing and create what biologists and others say may be unrealistically high expectations among local anglers.

Steve Quinn, editor of *In-Fisherman* magazine (considered the bimonthly bible among walleye anglers nationwide), concedes that the spread of information by his publication and other media not only raises interest in walleyes but also expectations by walleye anglers for what their local waters should produce.

"I can see how it puts pressure on the states to upgrade their programs with stocking or regulations," says Quinn, who previously worked as a biologist for a state conservation agency. "As an angler, I know what it's like to want better walleye fishing, but as a biologist, I know that it's really hard if not impossible to force a lake to produce more or bigger fish than it can."

ERIC ENGBRETSON

DIFFERENT PERSPECTIVES: Anglers want to catch more and bigger fish at walleye reservoirs such as Holter (left). Biologists say they want to improve fishing but caution that the lack of good habitat may limit walleye population growth and catch rates in many Montana waters.

WHY SO PRIZED

Unlike many game fish, which put up a scrappy fight once hooked, the main attraction of walleyes are their sweet, bone-free fillets.

"I grew up fishing trout," says Jan Carter, a taxidermist in Helena. "But the first time I tasted walleye, I said, 'This is it.'"

Walleyes also grow big. The state record is 16.63 pounds, and an average catch is roughly 1 to 2 pounds, about twice the size of the average stream trout brought to net.

Adding to the growing appeal of walleye fishing is that it often requires lots of mechanical gadgets and gear. Big motors, tri-hulled boats, depth-finders, GPS units, crankbaits, and other rugged-sounding equipment attract many anglers less enthralled by the frilly accoutrements of trout fly fishing, with its zingers, nippers, and tiny sewing utensils.

Walleye fishing may be growing in popularity, but trout still dominate the state's fisheries management landscape. A 2001 Montana FWP study found that 88 percent of the 2.7 million angler days in the state were spent fishing for coldwater species. Nevertheless, FWP officials say they pay close attention to warmwater species, especially walleyes. Better walleye fishing, they note, is a top goal of the agency's statewide ten-year warmwater management plan.

Central to that plan is boosting the number of walleyes caught at Fort Peck Reservoir. At 240,000 acres, the lake is by far the state's biggest, nearly three times the size of Flathead Lake. It also produces the most walleyes and attracts the most walleye fishing pressure, roughly 100,000 angler days per year.

However, in recent years walleye fishing there has been slow. Mike Ruggles, fisheries biologist for the reservoir, explains that the poor fishing is largely due to the reservoir's low water, which has reduced perch spawning habitat. Perch numbers rise when lake levels are high and flood shoreline shallows where the fish spawn. With fewer perch to eat, walleyes have been pursuing ciscoes, which live in deep water where it's difficult for anglers to fish. Anglers and biologists say that higher water levels could produce better walleye fishing.

There's less agreement, however, on how much walleye stocking the agency can and should do at Fort Peck. Because the reservoir has little natural walleye spawning habitat, FWP must stock it to maintain a decent walleye fishery. Currently, the agency stocks the most walleyes it can produce in its hatchery system and also allocate to Fort Peck Reservoir (other reservoirs across the state also require hatchery walleyes). Stocking will increase when a new Fort Peck multi-species hatchery is built. The $20 million facility, scheduled for completion in 2005, will more than double the number of walleye fingerlings the state can rear.

Will the new hatchery make Fort Peck one of the nation's premier walleye waters? Local supporters are crossing their fingers, but FWP officials caution anglers to not get their hopes too high.

"The critical factor that will make or break the Fort Peck walleye fishery is water levels," says Bill Wiedenheft, FWP northeast region fisheries manager. "Continued low water will make it tough for us to collect enough eggs from wild walleyes in Fort Peck for rearing in the hatchery and then stocking."

If water levels increase, however, FWP could collect more eggs to rear for stocking. Catch rates could rise, too. The ten-year Fort Peck Fisheries Management Plan, adopted last year, sets an ambitious catch-rate goal of 0.5 walleyes per hour, or one fish caught every two hours. Not only could high water boost walleye hatchery production, but by flooding shorelines it would provide more perch and shiner habitat, thus attracting walleyes to shallower water where they could be easier to find and catch.

FWP biologists say they will try to achieve their high catch-rate goal, but it won't be easy—even if the lake's water levels rise.

MONTANA OUTDOORS / MAGAZINE PHOTO BY DUSANSMETANA.COM

THE BIGGEST AND BEST: Fishing articles and TV shows highlight North America's best walleye fishing, raising expectations that such exceptional angling could be commonplace in Montana waters.

DUSANSMETANA.COM

Tom Dickson is editor of Montana Outdoors.

Despite rumors to the contrary, no walleye lake in any state consistently produces catch rates as high as 0.5 fish per hour. Jeff Tyson, a biologist with the Ohio Department of Natural Resources, says recreational catch rates on Lake Erie—considered the nation's premier walleye water—generally run between 0.3 and 0.4 fish per hour. Greg Power, an official with the North Dakota Department of Game and Fish, says Lake Sakakawea has averaged catch rates similar to Lake Erie's over the past 10 to 15 years.

"Statewide, our objective for walleye lakes is about 0.2 fish per hour, or one fish per five hours of fishing," he says, adding that a catch rate of 0.5 fish per hour is probably not sustainable. "A lake just can't produce anything near that year after year."

TOO MANY WALLEYES?

For a lake to produce such a high catch rate, say biologists, it would likely have become a "predator pit," a term for when too many predators overwhelm a lake's ability to provide food. That's the concern at Canyon Ferry Reservoir, near Helena, where a growing walleye population could be on the verge of exploding and thus outstripping available food. The result, say FWP officials, could be stunted walleyes and a decline in other popular game fish.

"Our concern," says Ron Spoon, FWP area fisheries manager at Helena, "is that we will end up with fewer trout, fewer perch, and a bunch of little walleye snakes."

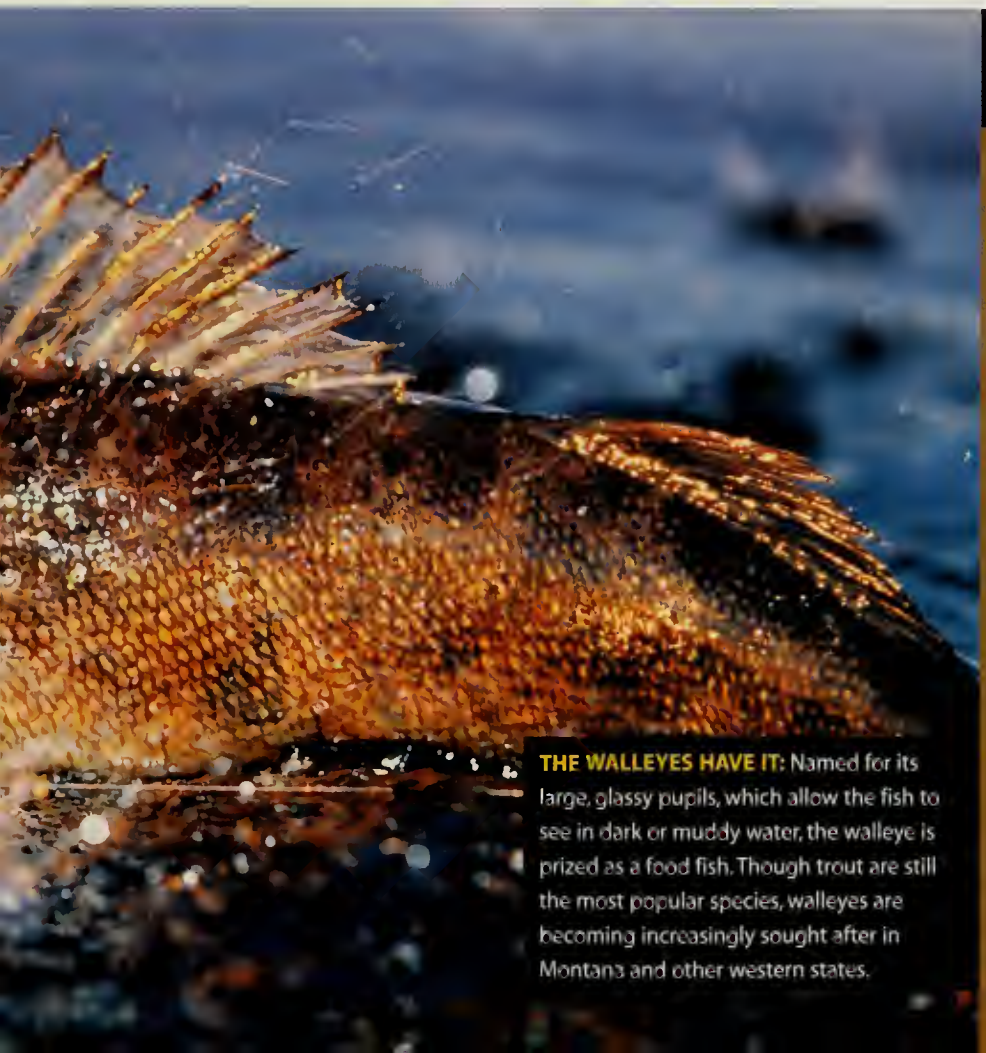
Impounded in 1954, Canyon Ferry Reservoir has for decades been one of the state's most popular fishing lakes. FWP stocks it with rainbow trout, which thrive in the cold, deep waters. A healthy, naturally reproducing perch population provides exceptional ice fishing most winters.

In the early 1990s, some local anglers began asking FWP to stock walleyes at Canyon Ferry. The agency resisted, citing a Montana State University study that said a new walleye population would quickly outgrow the available prey (perch) population and begin eating newly stocked trout. Eventually, the study concluded, Canyon Ferry would be filled with lots of walleyes, but they'd be small, and the trout and perch fishing would suffer.

The stocking debate proved moot, however, when walleyes began turning up in FWP survey nets. (Debate continues as to how the fish got into Canyon Ferry.) Regardless of their origin, however, the walleyes quickly prospered. By the late 1990s, anglers were regularly catching the glassy-eyed fish at a reservoir once renowned solely for its trout and perch fishing.

FWP survey nets now show the walleye population at high levels, with many fish approaching spawning age (five years old). That could produce a massive year class this spring or in 2004 and lead to an overabundance of predators. In response, the agency has instituted a 20-fish limit to knock down walleye numbers. Spoon says the agency has a responsibility to protect the fish species sought by Canyon Ferry's many trout and perch anglers. The new walleye limit, he adds, should also help decrease both the peaks and the inevitable crashes of the perch and walleye populations.

Still, the high limit has angered some local walleye anglers. Mike Sedlock of



THE WALLEYES HAVE IT: Named for its large, glassy pupils, which allow the fish to see in dark or muddy water, the walleye is prized as a food fish. Though trout are still the most popular species, walleyes are becoming increasingly sought after in Montana and other western states.

Montana's top walleye waters

Walleyes exist in lakes and warmwater rivers throughout the state's eastern two-thirds. Listed here are the largest and most popular (and the nearest large town).

- **Fresno Reservoir** (Havre)
- **Tiber Reservoir and the Marias River below Tiber Dam** (Shelby)
- **Hauser Reservoir** (Helena)
- **Holter Reservoir** (Helena)
- **Canyon Ferry Reservoir** (Helena)
- **Missouri River** (Great Falls to the North Dakota border)
- **Fort Peck Reservoir** (Glasgow)
- **Nelson Reservoir** (Malta)
- **Poplar River** (Scobey)
- **Milk River** (from Fresno Dam to the confluence with the Missouri near Fort Peck)
- **Bighorn River** (from Yellowtail Dam to the confluence with the Yellowstone at Bighorn)
- **Tongue River** (from the Tongue River Dam to the confluence with the Yellowstone at Miles City)
- **Bighorn Lake and afterbay** (southeast of Billings)
- **Cooney Reservoir** (southwest of Billings)
- **Yellowstone River** (between Billings and the North Dakota border)

JEFF HENRY/ROCHEJAUNE PICTURES

LOW WATER, LOW CATCH RATES: Due to prolonged drought and continual releases by the U.S. Army Corps of Engineers, the water level at Fort Peck has dropped severely in recent years. Biologists say the low water makes it difficult to capture walleyes to take eggs for rearing and stocking. Low water also reduces the spawning habitat of perch, a walleye food favorite. Low perch numbers send walleyes after ciscoes, into deeper waters where it's harder for anglers to find and catch fish.

Helena says he doesn't trust the FWP's netting results. He believes the population is declining, not increasing, and that the 20-fish limit could harm the walleye population.

"People aren't catching walleyes here like they were a few years ago," says Sedlock, a Walleyes Unlimited of Montana regional director. "I know what FWP is saying about their surveys, but something doesn't jibe."

Spoon explains the walleyes have temporarily stopped biting due to a massive year class of perch, which walleyes prefer to anglers' offerings.

"I know it's hard to believe when you fish all day and don't catch a single walleye," he says. "But our nets confirm the fish are there and their stomachs are full of perch."

COULD IT GET WORSE?

When FWP says it doesn't want too many walleyes in a reservoir, the most obvious question by anglers is, "What could it hurt?"

The answer, according to biologists nationwide, is that an overpopulation of walleyes or any predator fish can actually worsen the fishing.

"You guys up there don't know what you're asking for," says Wayne Nelson-Stastny, a South Dakota Game, Fish and Parks fisheries biologist at Lake Oahe. "You don't want the fishery we had in the late-'90s."

The problem, says Nelson-Stastny, was a predator boom. Oahe's walleye population had increased during the mid-1990s as the predators fed on abundant rainbow smelt, the reservoir's primary prey fish. Walleye fishing those years was excellent, with catch rates averaging 0.34 fish per hour and size averaging 18.5 inches.

Then the fishery tanked. First, the smelt population crashed, in part because it grew so big the fish began cannibalizing each other. Then, in 1997, exceptionally high water forced the U.S. Army Corps of Engineers to release massive amounts of water from the reservoir, flushing millions of smelt downstream.

"All of a sudden we had all these walleyes with nothing to eat," says Nelson-Stastny. "They started to starve."

At first, catch rates rocketed, nearly tripling to 1.1 fish per hour as the walleyes hungrily attacked lures and baits. But soon the malnourished fish stopped growing; average size dropped to 14.7 inches.

"They were emaciated," says Nelson-Stastny, "with thin, rubbery fillets you couldn't even eat."

Despite the high catch rates, anglers weren't interested in fishing for eel-shaped walleyes and went elsewhere. Fishing pressure at Oahe dropped by nearly 75 percent, from nearly 2 million fishing hours in 1996 to just 540,000 fishing hours in 2000.

"Actually, a lot of guys around here headed up to Fort Peck, where they could catch some decent-sized fish," Nelson-Stastny says.

Montana fisheries managers aren't the only ones keeping a close eye on the Oahe fiasco. Power says North Dakota doesn't stock Sakakawea in years when natural reproduction appears strong, to avoid producing too many predators.

"Every year we carefully watch our stocking rates," he says. "It's a real balancing act. We know what happened on Oahe, and that really scares us."

MORE RESPECT

No angler wants to see Montana lakes filled with scrawny walleyes. And, despite some disagreement with how FWP manages walleye waters, most anglers understand the agency has little control over weather and water levels. They also know fishing can't be

SOUTH DAKOTA DEPARTMENT OF GAME, FISH AND PARKS

OAHE'S WITHERING WALLEYES: From the mid-1990s to 2000, an overabundance of walleyes and a lack of prey fish caused the average size of walleyes caught on South Dakota's Lake Oahe to drop from 18.5 inches to 14.7 inches. Shown here (top) is a 1995 walleye in excellent condition compared to three others taken in 1999 and 2000 showing the effects of food deprivation. "They were emaciated, with thin, rubbery fillets you couldn't even eat," says one Lake Oahe fisheries biologist.

Managing the marble-eye

Montana FWP manages walleyes primarily by improving walleye and forage fish spawning habitat, monitoring populations, and stocking walleyes. The toughest of the three to control, says Kent Gilge, FWP fisheries biologist at Havre, is habitat.

"Every walleye lake in Montana is actually a reservoir," he says. "What mainly affects reservoir fish habitat are water levels. And frankly, we don't have much say over that."

Gilge says fisheries managers ask the Bureau of Reclamation and the U.S. Army Corps of Engineers, which control water levels on most walleye reservoirs, to keep water levels high in spring to flood shorelines and provide rearing habitat for young walleyes and forage species. "Unfortunately," he adds, "they don't take fish very highly into consideration."

Especially in drought years, the Corps releases water from Fort Peck and other reservoirs to raise downstream river flows so barges can travel along the Mississippi River. And farmers use reservoir water to irrigate crops, which sometimes deprives fish of water.

"Fresno Reservoir gets severely drained on average about once every four years," Gilge adds. "That makes it pretty tough on the walleyes and forage fish."

Another way biologists manage walleyes is by keeping track of populations. They lower gill nets in late summer and then weigh, age, and inspect the captured fish. Biologists also seine shoreline areas in late summer to see how the previous spring's year class, or generation of fish, is faring. Another way they learn about walleye populations is by conducting creel surveys, in which they ask anglers about the size and number of walleyes caught.

Stocking proves to be the most controversial aspect of the agency's walleye management work. Anglers want FWP to stock more, and the agency often resists. FWP biologists maintain they don't have enough hatchery fish to stock and can't always obtain more from other states. They also say that overstocking could lead to a glut of predator fish that could end up stunting the growth of walleyes and other game fish while harming prey fish populations.

great, or even good, every day. What may matter more to walleye anglers than catch rates and stocking levels could simply be getting more respect from state fisheries officials.

"I think in the eyes of many department biologists," says Sedlock, "a walleye fisherman is a second-class citizen. I think there's still this mentality that Montana is a trout state, end of story."

Adding to that perception is the belief that the FWP headquarters in Helena doesn't pay much attention to eastern Montanans' concerns. "One of my big questions," says Steve Harada, Walleyes Unlimited of Montana president, "is whether we are getting our fair share of FWP funding out here."

FWP officials say that, based on population and angling participation, both eastern Montana and walleye fisheries statewide receive an equitable proportion of agency funds.

"Warmwater anglers are definitely getting their fair share," says Chris Hunter, FWP fisheries chief.

But Hunter and other FWP officials note that the agency could do more to improve relations between it and the walleye fraternity. The agency was sluggish in its support for the Fort Peck hatchery and for a new warmwater fishing stamp, both strongly favored by Walleyes Unlimited members.

"There were sound financial reasons for our withholding support for both," says FWP northeast region supervisor Jim Satterfield. "But the walleye folks were really impressive in how they made those things happen, and in hindsight I think we might have done more to help them out."

In recent years, the two sides have come much closer together. "We really do want the same thing anglers want, which is better fishing," notes Wiedenheft, the northeast region fisheries manager. The agency has invited walleye anglers to help with survey nettings at Canyon Ferry and other reservoirs and with egg-taking operations at Fort Peck. Walleyes Unlimited has reciprocated by buying equipment for walleye management and installing perch habitat. The group's extensive website (walleyesunlimited.com) even features an "Ask the Biologist" section, where anglers can get answers from FWP staff to their fishing and management questions.

"Some of our guys don't get that FWP is really trying," says Mark Henckel, outdoors editor for the *Billings Gazette* and a longtime WU member. "But it only makes sense that biologists wouldn't want to produce a poor fishery."

MIKEBARLOW.COM

HELPING HANDS: In recent years, FWP officials and Walleyes Unlimited members have worked more closely to find new ways to improve walleye numbers and angling success. Says one walleye angler, "It only makes sense that biologists wouldn't want to produce a poor fishery."

A GOOD TIME IN MONTANA'S BADLANDS

Dinosaur bones, knockout scenery, mountain biking, Buzzard Day, and more—all amid some of the state's most spectacular surroundings—make Makoshika a must-see state park

BY BRETT FRENCH

SUNSET AT MAKOSHIKA STATE PARK // CAROL POLICH

This is an otherworldly place. Gray ridges of hardened sand jut from the earth like shark fins. Tan boulders balance on weather-weakened perches. Orbs of stone, half buried, stare upward at the vast, eastern Montana sky. For much of the year sagebrush, Rocky Mountain juniper, and ponderosa pine provide the only touches of color in this otherwise buff world, though in spring, splashes of greenery highlight the hills and coulees, and with summer come wildflowers that dot the landscape.

Welcome to Makoshika State Park. At more than 11,000 acres, this largest of Montana state parks stretches for miles east from I-94 near Glendive, offering visitors extreme solitude and a quiet found in few other places. A walk through the hills of this vast area is permeated with the sense that an ancient artifact or fossilized dinosaur bone may be found any moment protruding from the cracked, crunchy soil. It's a great place to take your imagination on vacation.

Eerie, quiet, mysterious. The Makoshika landscape seems both prehistoric and post-apocalyptic. Yet these same strange qualities account in large part for the park's tremendous allure. Carol Swanson of Glendive says that for visitors to appreciate the unique qualities of Makoshika they need an attentiveness not required in more glamorous parks, resplendent with their towering

CAROL POLICH

BURNED BARE: Geologists believe that Makoshika's dramatic erosion came after an ancient fire scorched the plain, exposing soil to the erosive effects of rain and wind.

mountains and glacier-fed rivers. There, the grandeur is obvious. "But here," says Swanson, who helped found a local volunteer group that supports the park, "you *discover* the beauty. Makoshika's grandeur requires more of the viewer, a personal interaction."

The park is right out the back door of Glendive, the seat of Dawson County in eastern Montana, and only minutes from the Yellowstone River. Its proximity to Glendive is one reason the park is so cherished by townsfolk, but not the only one.

Swanson visits often. She has hiked up gullies and to caprocks—large rock formations that look like giant mushrooms—sometimes showing off the spot to friends, who have compared the land to a lunar surface. At other times, Swanson visits the park alone, seeking solitude and rejuvenation.

"I go to the park as much as possible," she says. "There are certain places I like to go where the wind blows through you and the stress dissipates. There's something healing about it."

She also appreciates the history of the rocky terrain, and the secrets that it holds.

"It's like a huge open page of a book," she says of the exposed geologic features. "There's a sense of the primeval."

WEATHERED WONDERS

Makoshika—taken from the Lakota Indian phrase meaning "land of bad spirits" and pronounced Mah-KO-shi-kah—is to badlands landscapes what Florence, Italy, is to Renaissance art.

"They are the most geologically spectacular badlands in the entire region," says park manager Dale Carlson.

Geologists speculate that one reason Makoshika's landscape is more eroded and defined than other badlands is that an ancient grass fire once charred the plain, exposing sand and clay soils to the weathering effects of water. Years of runoff have exposed two main sedimentary layers. The Hell Creek formation contains most of the exposed rocks, and the Fort Union formation caps some of the eastern hills. It is in the Hell Creek soils, built up some 65 million years ago, that dinosaur bones have been found, while the Fort Union formation contains fossils of more recent reptile, fish, and mammal species.

According to Dr. R.W. Hiatt, a Glendive ophthalmologist who spent years studying the park and searching for fossils, most of the coulees in Makoshika are at the lower Hell Creek level. Visitors hoping to see fossils should focus their explorations on the park's coulees.

Makoshika's clay and sand soils, which hold everything from dinosaur to ancient plant fossils, built up millions of years ago.

"Most of the park's sedimentation was laid down when the area was a lowland tropical swamp environment with a fluctuating inland sea," says Carlson.

During that prehistoric time, this now-arid region was as humid and soggy as

GARY LEPPART

GARY LEPPART

ROCKS THAT SPEAK: Makoshika's landscape tells stories going back millions of years. Petrified dinosaur bones (above) are reminders of the area's prehistoric residents. Fossilized leaves (left) attest to a more tropical climate eons ago. Caprocks (right), formed when harder limestone sits above softer claystone, reveal the effects of elements over time.

Brett French is a writer living in Billings.

coastal Florida is today, containing large lagoons ringed by lush growth. Paleontologists have found fossils of palm trees and magnolia shrubs in Makoshika's soil. Succeeding ice ages erased most of that plant life, as well as the once-prolific dinosaurs.

STORIES IN STONE

Hiatt's list of fossil finds shows the area's diversity of plant and animal life millions of years ago. He has found parts of fish such as rays, amphibians such as the salamander-like habrosaurus, crocodiles and other reptiles, rare and extinct birds and mammals, and several species of "terrible lizards"—including pieces of the duck-billed hadrosaur (Montana's state dinosaur) and the hugely popular tyrannosaur.

One of the park's most spectacular fossil finds is now the centerpiece of its visitor center, which opened in 1995. The skull of a triceratops, a 20-foot-long rhinoceros-like plant eater with three horns and a wide bony plate around its head, is housed in the building for public display. The center, built to blend in with the park's natural landscape, also contains other fossils as well as interpretive displays, including kiosks that explain the park's unique geology, abundant wildlife, and varied history.

MONTANA FWP

VOCAL LOCALS: Nearby residents voice their strong support for Makoshika at the annual March for the Parks and Buzzard Day celebrations.

In the basement, another 1,000 or so fossils unearthed from Makoshika are locked up next to the park's paleontology laboratory. There, fossils are meticulously cleaned, repaired, and catalogued by scientists and volunteers for display. Currently, a duck-billed dinosaur's rib bone, several alligator teeth, and pieces from a triceratops and a tyrannosaur await future examination.

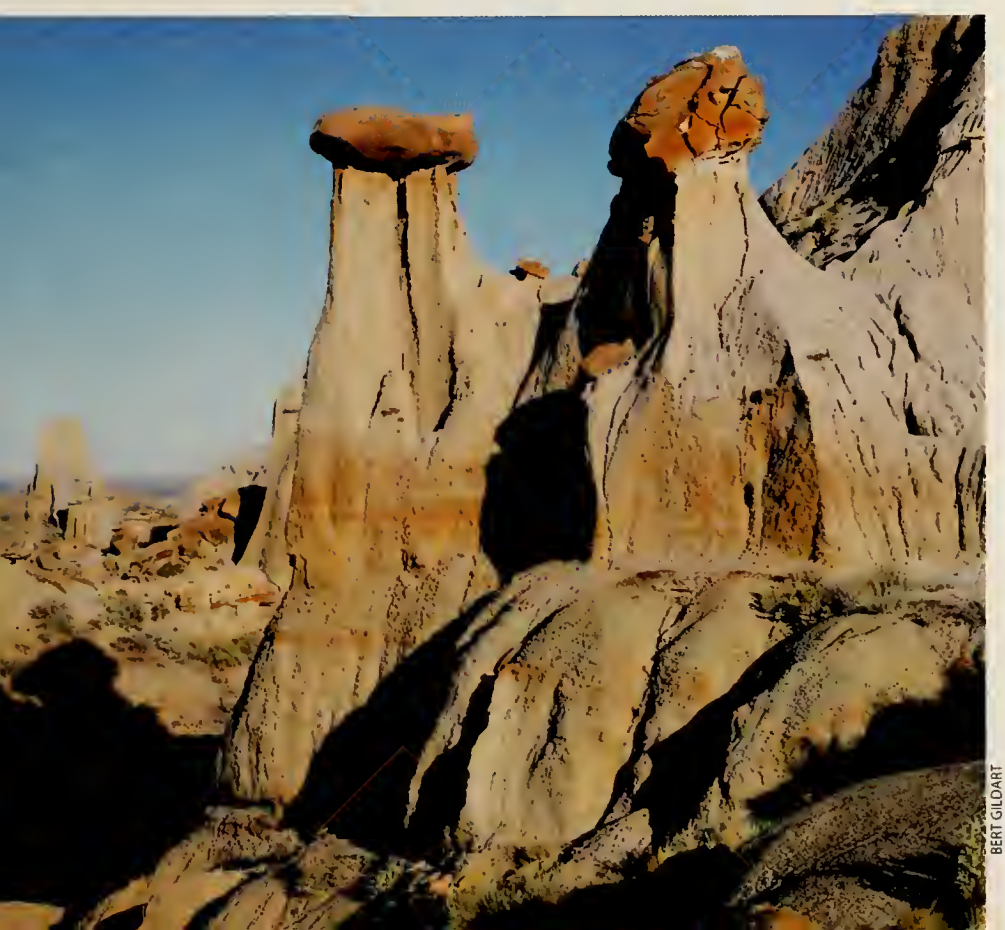
Though the park's wealth of dinosaur remnants attracts fossil fans from afar, visitors are warned they may not dig for, touch, or remove fossils. They can, however, report their fossil discoveries, the more unusual of which are then removed by experts.

"With significant finds, the Museum of the Rockies takes over," Carlson says.

Based in Bozeman, the museum is noted for its dinosaur displays assembled under the eye of famed dinosaur hunter Jack Horner. For less significant discoveries, the park oversees volunteers who labor to remove fossils before weather erodes the artifacts away. Last summer, says Carlson, three volunteers and an intern removed a juvenile triceratops skull that had been discovered four years earlier.

The delay, explains Carlson, was due to the park lacking staff to haul the heavy casts, which are placed around fossils to prevent them from breaking apart during transport.

"It takes a lot of money and time to excavate a fossil of that size," he says.



BERT GILDART

VISION REWARDED

Long before there was a Makoshika visitor center, or even many visitors, visionary eastern Montana residents recognized the uniqueness of the badlands and the need to preserve it. As early as 1892, citizens were advocating that the badlands be turned into a park. Though the federal government considered the land for a national park, and even built the first road into the area in 1939, it was the state of Montana that eventually preserved this rugged gem as a public site.

That was due in large part to lobbying by a local landowner couple, Catherine and A. J. McCarty. In the 1940s, the McCartys donated a portion of what is now the park to Dawson County with the provision that it be protected. But it wasn't until 1953 that Montana finally brought the area into the state park system, along with other nearby

CHUCK HANEY

JEFFREY RICH

PHIL FARNES

A NICE PLACE TO VISIT: Built in 1995, the visitor center was designed to fit into the park's stark, spacious landscape. The center houses a triceratops skull, other fossils, and information on Makoshika's famous geology. Displays also help visitors learn about resident wildlife such as the turkey vulture and short-horned lizard.

lands added through leases and easements. The year 2003 marks the park's 50th anniversary, just a flash in geologic time but a momentous occasion for park supporters.

A toy purple dinosaur resting on his truck's dusty dash, Carlson drives through the park while listing some of Makoshika's many attributes that make the park so popular:

- an 1,800-square-foot picnic shelter,
- public rifle and 3-D archery ranges,
- 6 primitive tent camping sites offering spectacular views,
- 15 recreational vehicle parking spots,
- an 18-hole folf (Frisbee golf) course,
- 40 bird species, and
- 150 plant species.

There's much more, says Carlson. Three designated hiking trails lead walkers to vast vistas of the plains, as well as to formations such as Natural Bridge along the Caprock Nature Trail and the whale-shaped hill named Moby Dick in the Sand Creek area. The park also features a 200-seat, wheelchair-accessible amphitheater nestled in the badlands. On the third weekend of each August, Theatre in the Park melodramas are held in the lighted amphitheater. In late April, the local support group, Friends of Makoshika, hosts the March for Parks walkathon fundraiser. Each Thursday throughout the summer, education programs expose children to the park's wildlife, dinosaur history, and environmental wonders. The state park even has its own video, *Makoshika: Crossroads to the Past*, narrated by former governor Marc Racicot.

More than 12 miles of improved and unimproved roads carry visitors to hundreds of spectacular vistas. Some roads are only recommended for high-clearance vehicles, such as pickup trucks. And when it rains, travelers in any vehicle are well advised to steer clear of the dirt roads, which turn slick as grease.

Those on foot should be prudent, too. Carlson says sink holes, cave-sized soft spots eroded in the ground, can swallow careless hikers. The holes serve a useful purpose for wildlife, providing dens, shelter, and shade for coyotes, mountain lions, and bobcats, but they're not places people want to dwell. A better way to see wildlife is to slowly and quietly hike the trails at dawn or dusk, scanning ravines for hidden critters. Visitors are more likely to see mule deer than any other big game animal. The deer, which can be hunted in certain parts of the park during the fall season, dine on grasses along the roads and coulees during the morning and evening.

Another well-known Makoshika resident is the turkey vulture, which the park celebrates each year with Buzzard Day. Turkey vultures—identified by their trademark red head and wide, dark wingspan—return to the park each spring from southern wintering areas to nest and prowl the badlands for carrion. On the second Saturday of June, the park marks the migration back north of the 40 to 60 native buzzards, as they are commonly known, with events such as a 1-mile fun run and an 8-kilometer race up the park's switchbacks. Event proceeds help support the park.

NO LONGER JUST A LOCAL ATTRACTION

Buzzard Day is just one of many reasons a growing number of residents and nonresidents are visiting Makoshika. Though most travelers passing by on nearby I-94 have no idea of the wonderland just beyond the exit ramp at Glendive, Carlson says that Makoshika's reputation as a great place to

explore has been spreading. Visitation was up in 2001 nearly 10 percent from the year before, from roughly 42,000 visitors to 46,000. Those visitors give a big boost to Glendive's economy, making Makoshika the town's top tourist attraction.

Both the local chamber of commerce and the state of Montana advertise the park's attractions to out-of-state visitors. The marketing appears to be working. Though half the visitors are Montanans, license plates from Minnesota, North Dakota, and Washington increasingly fill the parking lots. Some come to search for fossils, others to hike the unusual landscape. Like the locals, some come for the summer events or just to camp out for the weekend.

"We're also seeing more mountain bikers every year," Carlson says.

With its many trails and usually vehicle-free roads, the park is a great place to cycle. Alaskans Todd and Cyndy Fisher have stopped at Makoshika with their son, Greg, on a 50-state tour. Todd and Greg quickly take advantage of the park's paved roads to cycle and exercise their road-weary muscles.

Afterward, Todd extols the virtues of Makoshika's unusual landscape.

"This place has a whole different appeal to me," he says, standing outside his RV as late-afternoon shadows lengthen. With a background in the oil business, he's especially intrigued by the exposed bluffs and their prehistoric layers. "The stratification in the rock exposed here is miles beneath the ground in Alaska," he says.

As the setting sun finally disappears over the horizon, brown rock is brushed red, and then a soft pink, before the light ebbs. And all the time, as it has for thousands of years, the wind blows in a hushed voice, as if in reverence amid this rocky, otherworldly cathedral.

This year Makoshika State Park celebrates its 50th anniversary. The public is invited to join the festivities on July 20, when the park plans to provide food, music, and history talks. For details, call (406) 377-6256.

TIME TRAVEL: A walk through Makoshika is like going back 100, 1,000 or even 1 million years in time. It's a place, say park supporters, where prehistory is always present.

CHUCK HANEY

IF YOU GO

Open: All year.

Visitor center hours:
Memorial Day–Labor Day: 10 a.m.–6 p.m.
Labor Day–Memorial Day: 9 a.m. – 5 p.m.

Information: (406) 377-6256 or (406) 232-0900; fwp.state.mt.us/parks.

Activities: Picnicking, hiking, wildlife viewing, photography, camping, archery and rifle shooting, Frisbee golf, children's games, and the study of geology, paleontology, and archaeology.

Features: Visitor center, nature trails, picnic sites and shelter, outdoor amphitheater, shooting range, 3-D archery range.

Services: Campsites, barbeque grills, leashed pets allowed, gift shop, access for the disabled, books, maps, RV parking, public restrooms, water.

Directions: Follow I-94 east to Glendive. Makoshika State Park is located one-quarter mile southeast of Glendive on Snyder Avenue. Follow the state park signs or dinosaur tracks through town.

2003 Events: March for Parks, April 26; Buzzard Days, June 14; Makoshika 50th Anniversary Celebration, July 20; Theatre in the Park, August 15–16.

East Montana Badlands: 56,000 acres.

Makoshika State Park Size: 11,531 acres.

Elevation: 2,374 feet.

Ecosystem: A semi-arid, short-grass prairie steppe environment. Less than 20 inches of yearly precipitation.

Established: 1953.

Fauna and flora: 40 bird species and 150 plant species.

Paleontology: Fossils of ten dinosaur species have been excavated.

Barely Afloat

As Montana's white sturgeon population sinks to fewer than a dozen individuals, biologists race against time to keep the majestic fish from disappearing altogether

By Ray Stout

THERE WAS A TIME, EONS AGO, when massive white sturgeon swam each spring from the Pacific Ocean up the Columbia River, from what is now Washington into British Columbia, through the northern tip of Idaho, and finally upstream to Kootenai Falls, located between today's Troy and Libby, Montana. The fish would spawn in the river's upper reaches and then head back downstream, traveling 700 miles or more to feed in the Pacific before returning again the following year.

That historic migration came to a halt at the end of the last ice age, roughly 11,000 years ago, when retreating glaciers created a waterfall, Bonnington Falls, on the west arm of Kootenay Lake, a natural wishbone-shaped lake perched above the Idaho border in British Columbia, just upstream of where the Kootenai River flows into the Columbia River. From that time on, fish above the falls could no longer move to and from the ocean, thus making them the only naturally landlocked white sturgeon population in North America (a dozen or so other populations have since become separated from the ocean by dams).

DONALD M. JONES

Thousands of years after Bonnington Falls became a fish roadblock, the landlocked white sturgeon faced different and more severe changes to their natural surroundings. As the region was settled, mining and fertilizer processing polluted rivers with heavy metals and toxins, which killed the underwater insects that sturgeon eat. Dikes that drained bottomlands for farming and housing eliminated many river wetlands where young sturgeon previously hid and grew. Though Kootenay Lake is naturally made, the Corra Linn Dam built at its outlet in 1931 slowed the flow of the Kootenai River upstream, allowing suspended particles of silt to sink and fill in spawning cobble.

Another big setback to the white sturgeon came in the early 1970s, with the completion of Montana's Libby Dam. The hydropower structure traps nutrients in Lake Koocanusa, thus depriving organisms downstream of food. It also disrupts the natural rise and fall of the river, preventing the natural flood-borne scours that traditionally washed silt from downstream spawning cobble each spring.

All of which leaves the Kootenai River white sturgeon now wallowing on the federal government's list of endangered species, where it was placed in 1994. And it seems only occasionally that North America's largest freshwater fish—which can reach 15 feet long, weigh nearly a ton, and live more than a century—ever venture upstream into Montana anymore. In fact, according to the Montana Fish, Wildlife & Parks biologist heading the state's sturgeon recovery efforts, just a handful of white sturgeon still swim in the Treasure State portion of the Kootenai River.

"Only a few fish have been documented in Montana during the past decade," says Brian Marotz, who works out of Kalispell. "If I had to guess, I'd say fewer than ten remain here."

Preventing the extinction of the Kootenai River population—and then restoring it to self-sustaining levels—is the goal of an ambitious effort among Montana, Idaho, British Columbia, the

ONE FOR THE FRYING PAN: White sturgeon can reach 15 feet long and weigh nearly a ton. This specimen, taken from Idaho's Snake River in the early 1900s, weighed 850 pounds. The landlocked variety in the Kootenai River, however, rarely exceeds 350 pounds, because the fish can no longer reach the fertile Pacific Ocean to feed.

Below left: Kootenai Falls, near Troy, Montana, was the prehistoric upstream barrier for white sturgeon moving up the Columbia River into the Kootenai River.

IDAHO STATE HISTORICAL SOCIETY LIBRARY AND ARCHIVES

A LONG, STRANGE TRIP: In prehistoric times, white sturgeon migrated from the Pacific Ocean up the Columbia and Kootenai Rivers as far east as Kootenai Falls, near what is today Troy, Montana. Roughly 11,000 years ago, retreating glaciers formed Bonnington Falls, in today's British Columbia, which blocked ocean-based sturgeon from moving farther upstream. The falls also trapped sturgeon in the Kootenai River, creating the only naturally landlocked white sturgeon population.

During the 20th century, the Kootenai River population was beset by pollution, riparian wetland drainage, and unnatural changes in river water levels. Today the number of sturgeon in Montana's portion of the river is estimated at only ten fish.

MONTANA OUTDOORS

U.S. Fish and Wildlife Service, and the Kootenai Indian Tribe. Federal, state, and tribal biologists are studying sturgeon movements, stocking hatchery-reared fish, and recommending water level adjustments to improve spawning conditions. They might also build structures that could enhance spawning sites so the white sturgeon could reproduce on their own. It's a huge effort, but with the population teetering on the verge of extinction, to not act aggressively would mean letting the Kootenai River population die out.

"Basically what it comes down to," says Marotz, "is that we have an obligation to not let things go extinct as a result of our actions on this land. We can't just let this fish disappear."

FIRST STEPS TO RECOVERY

The first step to stem the population's decline came in 1979, when Montana banned white sturgeon fishing in the Kootenai River. A few years later, Idaho and British Columbia followed suit. Then, in 1994, the United States placed the fish on its list of endangered species.

How did the Kootentai River population qualify for federal listing when plenty of white sturgeon remain in the Columbia and Snake Rivers? Isolation from its sturgeon cousins has made the Kootenai River fish a genetically unique population, say scientists. What's more, fish in the two populations differ greatly in size. The largest anadromous white sturgeon ever caught weighed 1,837 pounds, while the largest Kootenai River sturgeon came in at "only" 350 pounds (Montana's state record, caught in 1968, weighed 96 pounds).

White sturgeon received another boost in 1999, when the U.S. Fish and Wildlife Service released its Kootenai River White Sturgeon Recovery Plan. The top goal of the plan: Prevent the population from going extinct. In 1997, the wild white sturgeon population in the Kootenai was estimated at roughly 1,500 fish, but according to recovery team leader Bob Hallock, a federal biologist, that number is now down to about 660. At that rate, say Hallock and other biologists, the wild population could wink out in just a few decades.

That rapid decline makes it essential to raise hatchery sturgeon and release them into the river. Currently there are about 13,000 hatchery fish in the Kootenai River population, and more are being raised. At the Kootenai Tribal Sturgeon Hatchery, near Bonners Ferry, Idaho, thousands of tiny white sturgeon cavort in 15-foot-long steel troughs filled with a steady stream of filtered river water. A year or so from now, they will be stocked into the best remaining habitat as part of the effort to restore the Kootenai River population

"You're looking at sturgeon about three months old!" shouts fisheries technician Eric Wagner, trying to be heard over the constant roar of water while lifting the lid off a waist-high, rectangular tub to reveal fish the size of his index finger.

Some of the roughly 4,000 sturgeon fingerlings rest quietly on the bottom, their tapered body and nose nearly flush with the floor as though sanded flat. Others jiggle to the top, turn over, and suck the surface with their mouth, which is below the head and can extend out like a tube. The fingerlings are looking for grains of fish food.

Along each fingerling runs a row of sharp plates, called scutes, which have already become tough enough to deter predators. The little sturgeons' whiskerlike barbels, below the snout, are covered in taste buds that allow the fish to find food. And the

SUSANSMETANA.COM

FISH OF THE FUTURE: At the Kootenai Tribal Sturgeon Hatchery in Idaho, thousands of finger-length white sturgeon are being raised for later release in the Kootenai River.

Ray Stout is a freelance writer from Eureka.

DONALD M. JONES

FOOD CONTROL: Before Libby Dam was built, in the early 1970s, spring floods would wash silt from downstream gravel and cobble where sturgeon spawned. The dam now controls floods. It also traps nutrients in Lake Koocanusa, reducing the number of aquatic insects downstream that sturgeon eat. The massive fish, like this one caught and released in Idaho's Snake River, find food with their whisker-like barbels, which are covered in taste buds.

BILL LINDNER PHOTOGRAPHY

sharklike tail will later be able to power the adult against strong river flows.

Despite their name, these sturgeon aren't yet white. Sturgeon are born dark so they can hide from predators, says Wagner. Over the next few years, as they are exposed to natural daylight, the fish will lighten, though they will always retain some dark mottling throughout their lives.

Rearing these small sturgeon—which come from eggs and spawn taken from wild fish captured in a stretch of the Kootenai near Bonners Ferry—is difficult. The fish are susceptible to disease, and many don't survive the 15 months or so it takes for them to reach release size.

What's more, simply dumping a hatchery-reared sturgeon into the Kootenai doesn't necessarily create a self-sustaining population. Sturgeon don't spawn until about age 30. Because hatchery fish have been released into the Kootenai only since 1992, it may be another 20 years before they start producing young of their own.

Meanwhile, the relatively few remaining wild fish are getting older. "At some point those [wild] fish may get too old to be sexually fertile," says Marotz. "Or they could just die off."

If that happens before the hatchery-reared fish begin spawning, he says, there could be no source of eggs to rear in the hatchery—much less in the wild. At the current rate of population decline, it will be only 10 to 20 years before wild sturgeon spawning no longer helps support the Kootenai River population.

"It's a race against time," Marotz says.

EGGS SUFFOCATE

Though the hatchery effort is key to any hope of the white sturgeon's recovery, stocking fish to create a self-sustaining population will not work without a place for them to reproduce. That's why the recovery plan also focuses on changing water flow conditions to improve spawning habitat.

Libby Dam appears to have disrupted sturgeon spawning success. Biologists have captured only a few dozen wild-born juveniles since 1974, the year the dam began operation. Built to hold back water, the structure prevents floods that once scoured cobble spawning areas. As a result, the stones are now buried in silt.

Silt hampers spawning for many species, and the white sturgeon is no exception. Most newly laid sturgeon eggs only survive by sticking to clean cobblestones, where fresh water can flow and provide the embryos with oxygen. When silt fills in cobble, the eggs settle into the soft material and suffocate.

The sturgeon aren't helping matters, either. Biologists have discovered that some of the females have been spawning over sand, where the eggs die for lack of oxygen.

Vaughn Paragamian, senior fisheries research biologist for the Idaho Department of Fish and Game, suspects that disruptions in river water flow may disorient the spawners. Libby Dam reduces historic flows from upstream, while Corra Linn Dam creates lower levels in Lake Kootenay than were there during past millennia.

"That mix may be confusing white sturgeon to feel comfortable that they're spawning in the right place," says Paragamian.

The U.S. Fish and Wildlife Service has had some success convincing the U.S. Army Corps of Engineers, which controls Libby Dam, to modify flows to help mimic historic water flows. But much still needs to be done. Marotz hopes a new flood control strategy, called VARQ (for variable release flow, Q being a symbol for flow) and currently under review by the Corps, will do even more for sturgeon. The strategy calls for increasing dam water releases in spring, when sturgeon need it most, while still allowing the Corps to control floods and retain water for power generation and recreation in Lake Koocanusa.

Despite the promise of VARQ, Marotz doesn't think Libby Dam will ever be able to release enough water to adequately flush silt from the downstream spawning cobble. Many homes now sit in the river's floodplain, especially near Bonners Ferry and in Canada around Kootenay Lake.

"This is a huge problem," he says. "With all the people now living in the floodplain, I don't see much hope for getting adequate water releases to help sturgeon."

Adds Paragamian, "I think we're going to

GEORGE ROBBINS

CRAIG & LIZ LARCOM

A HANDFUL REMAINING: Though white sturgeon are still caught by anglers in the Snake River and Columbia River (right), the fish has become rare in Montana. The last one seen by anglers or biologists was caught in 2001 from a tributary of the Yaak River (above).

have to bring something to the fish to compensate."

For example, he explains, the spawning areas could be artificially enhanced. One possibility would be to add rock weirs in areas of the river. The structures would be built to constrict the river flow, creating a faster current that flushes out the sand and silt that smother sturgeon eggs.

Another way of improving fish habitat might be to add nutrients to the river below Libby Dam to boost food production. However, though it may hold some promise for helping the sturgeon, nutrient addition isn't something Montana wants to begin trying yet. "At least not until some scientific evidence supports doing that," Marotz says. But he does favor a feasibility study now being done in Idaho, where scientists are learning how adding various amounts of nitrogen and phosphorous would affect the Kootenai River ecosystem.

HOW MANY LEFT?

Further frustrating biologists is the fact that white sturgeon seem to use just a fraction of their available habitat. Though the fish in the Kootenai River population can use roughly 170 miles of water between Corra Linn Dam and Kootenai Falls, they spend most of their time in Kootenay Lake. And they only spawn in a tiny portion of their range, roughly an 11-mile stretch downstream from Bonners Ferry. Perhaps the most perplexing mystery of the Kootenai white sturgeon population, say biologists, is why those fish rarely swim upstream into Montana waters.

"It's troubling that they aren't utilizing this part of their habitat," says Marotz. "We've got plenty of clear cobble up here that would be great for spawning, but for some reason they just don't come up here anymore—if they ever did."

Sue Ireland, the Kootenai Tribal Sturgeon Hatchery's administrator and lead biologist, wants to plant more juvenile sturgeon in Montana waters. If the existing sturgeon won't spawn by Kootenai Falls, maybe ones stocked near there would.

"We would like to know if sturgeon released in Montana would stay in Montana and utilize that part of the river," she says, "or if they would just move downstream like they did during a release in Montana in 1994."

Ireland, like other biologists, is puzzled by what seems to be some invisible barrier keeping the big fish from heading upstream into the Treasure State.

"We know there used to be sturgeon in Montana," she says, "and we would like to know if the habitat provides the necessities for juvenile rearing."

For several years, Paragamian has been following sturgeon captured in Kootenay Lake then surgically tagged or fitted with radio or sonic transmitters and released.

"We have never had one go into Montana," he says.

At least a few untagged sturgeon may still haunt the state's waters, however. Daryl Anderson saw one several years ago, and he'll never forget the sight. Anderson, sheriff of Montana's Lincoln County, was fishing on the Kootenai when the massive fish surfaced.

"The devil came up right in front of me," Anderson recalls. "He was a good 5 feet long—a big sturgeon." The fish rose nearly out of the water, rolled, and came down with a huge splash. "I almost fell off the rock there," he says.

In 2001, a Montana angler caught a white sturgeon from a tributary of the Yaak River, which runs into the Kootenai. That was the last one anyone has seen in Montana. Marotz says he and other FWP staff members recently tried to find and capture a white sturgeon, but with no success. "We really gave it a good effort," he says.

Pat Graham, FWP director during the 1990s, recalls the thrill of seeing a white sturgeon in 1980 downstream of the falls. He was working as an agency fisheries biologist searching underwater in scuba gear for the elusive fish. Graham says the 4- to 5-foot sturgeon darted away when he and other FWP divers first saw it while searching nearly 100 feet below the river surface. It then lay on the dark river bottom, illuminated by their flashlights.

"When you realize how few of them there are, the fact that we even saw one was quite exciting," says Graham, currently director of the Arizona Chapter of The Nature Conservancy.

Unfortunately, few people ever get to view a white sturgeon to appreciate it firsthand. That's frustrating for sturgeon supporters such as Marotz. He says that anyone who sees the majestic fish would be convinced that white sturgeon merit protection and restoration.

"These fish have been around this region, doing well, since the last ice age and probably before that," he says. "This is such a precious thing, and when you see one of these fish, which are 50, 100 years old or older, you're just struck by how important it is to have this living relic of Montana's natural heritage still with is. We can't just lose that."

Full-Contact Birding

Have you got what it takes to watch birds?

by Matt Flavin

Illustrations by Jeff Tolbert

He was said to be the foremost birder around. His life list included nearly 400 sightings in Montana alone.

"So," he said, a smile crossing his beat-up face, "you want to take up birding. What makes you think you've got what it takes?"

"Let's see," I replied. "I've taken ornithology courses at the University of Montana, I love the outdoors, and I've got 20/20 vision. Is that what you mean?"

"Hell no! I'm talking about high pain threshold, quick reflexes, rapid healing, and indifference to harassment." He also mentioned something he called "tyke-wando." As he brought me coffee, I noticed he had a tremor in one hand and walked with a severe limp.

I told him I didn't know how all that applied to birding.

As he eased himself stiffly into a chair, he said, "You know, most people think of bird watchers as effete trust-funders wandering through meadows in khaki shorts and straw gardening hats. Well that's not the case at all. Your typical Montana birder is likely to be sturdy as a stump, wearing ripped jeans, chewing tobacco, and likely as not missing a tooth or two in front. And some of the men birders are even rougher looking.

"Birding's definitely a rough physical activity," he continued, "like one of those "extreme" sports they show on ESPN. Take up birding and you'll have to endure the ravages of biting mosquitoes and flies as well as extremes of hot, cold, and wetness.

"Just walking is hazardous to a birder. That's because you always have to be looking up instead of at what's underfoot. You're constantly tripping over roots, plunging into muskrat holes, or stepping off steep embankments. You probably noticed my limp. That's from a busted kneecap I got last year when I tripped over a hiker who'd stopped to tie his shoe.

"There's also the knee-driving hazard. I don't know how many rollovers I've suffered trying to steer with my knees while leaning out the window with the binoculars trying to get a focus on some bird by the roadside or on a telephone wire. In the last one, not only did I get a steel pin in the hip, but I lost one of the cushiest jobs I ever had. Damn

"I don't know how many rollovers I've suffered trying to steer with my knees while leaning out the window with the binoculars."

Matt Flavin writes humor articles about western outdoors life. Jeff Tolbert is an illustrator and graphic artist.

crybaby senior citizens ratted me out to the nursing home authorities, so they hired somebody else to drive the nature tour bus."

"Bummer," I said. "You mentioned harassment. What kind of harassment?"

"Mostly from irate citizens and police. Some of the best in-town birding's in the neighborhood parks. A man skulking around in the bushes with binocs sometimes attracts attention, you know what I mean? Somebody turns you in, and before you can say John James Audubon, you find yourself cuffed, face down in the fescue, while some deputy with his heavy shoe on your neck is saying you have the right to remain silent."

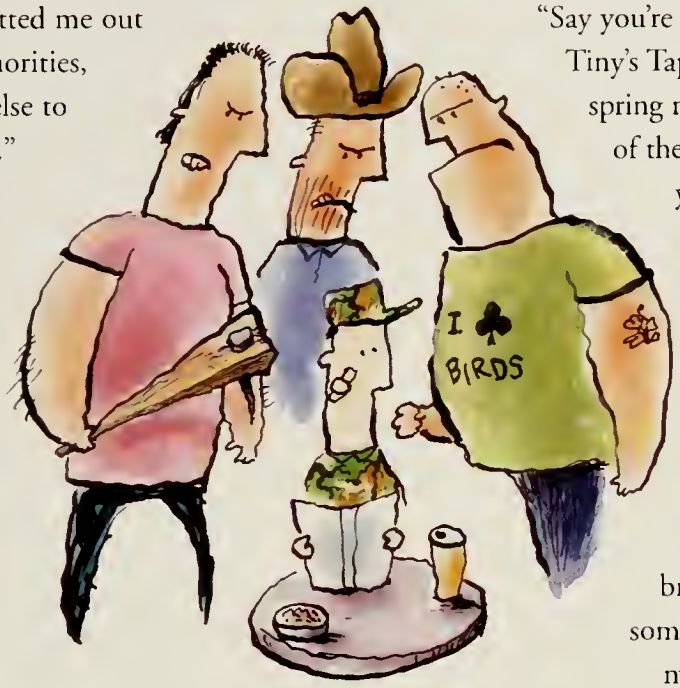
Earlier he'd mentioned something called "tyke-wando." I asked if that was some sort of exercise for kids.

That struck him as funny, and his cackle disclosed the absence of several front teeth. "Tae kwan do is a style of karate. And I've signed up for some lessons myself. A birder knows tae kwan do, he can fight off a dozen attackers at once."

"Why would a birder need to do that?"

"Let me give you a…*hypothetical*," he replied. "Say you're having a few at Big Tiny's Tap in Lewistown one spring night—and let's say some of the local rowdies ask why you're decked out in your camo when it isn't even hunting season.

"Suppose you say you're there to observe the mating rituals of the sharp-tailed grouse at daybreak. Suppose there's some laughter, an ugly comment or two—well, that's where some of that tae kwan do really came in—er—*might come* in handy," he said, fingering an ugly scar that ran down his left cheek. "*Hypothetically*, of course," he added.



"Say you're having a few at Big Tiny's Tap in Lewistown one spring night—and let's say that some of the local rowdies ask why you're decked out in your camo when it isn't even hunting season."

Despite the rigors he described, I was determined to take up bird watching. I told him I had all the necessary gear: binoculars, boots, and bug repellent. Was there anything else I needed?

"You forgot the most important thing of all—the manual."

"Oh, right, you mean the *Field Guide to the Birds of North America* put out by the National Geographic Society."

"Nah," he replied, reaching for his cane. "I mean the *First Aid and Safety Handbook* put out by the American Red Cross."

JOHN LAMTING

A DAM IMPROVEMENT

BY JOHN FRALEY AND JOE DOSSANTOS

It seemed impossible for trout anglers and hydropower facility owners to ever see eye to eye. Then came the Clark Fork Settlement Agreement…

The fact that hydropower dams disrupt river ecosystems can hardly be argued. How could massive concrete barriers that block free-flowing rivers, turning them into lakes, sending torrents of water downstream at times then cutting off the flow at others, *not* cause environmental problems?

The big question, then, is not whether dams impair rivers but rather how much harm they do, and to what extent the companies that own and operate dams are responsible for reducing harm to a river's fish and wildlife populations.

That's the issue that for years has been facing hydropower dam operators, conservation agencies, anglers, boaters, environmentalists, and others concerned about the flow of river water across western Montana. From the mid-1980s to the present, 14 private hydropower dams have requested or will request to be relicensed by the Federal Energy Regulatory Commission (FERC). Under federal law, dam owners wanting to continue operation must change the way they store and release water to reduce disruprions to the environment. They must also provide mitigation—payment for projects that protect or restore the fish and wildlife habitat that dams disturb.

The FERC relicensing process sends strongly held values crashing into each other. Dam owners and shareholders, who understandably want to make money, point out that dams provide a relatively inexpensive source of pollution-free energy. Anglers, environmentalists, and kayakers place more value on healthy fish populations, vibrant river ecosystems, and accessible recreational water. They maintain that the full environmental costs of dams aren't adequately factored in to discussions about the benefits of hydropower.

These strong differences of opinion often make the relicensing process contentious. For example, arguments over relicensing mitigation for one Montana hydropower facility, Kerr Dam at the outlet of Flathead Lake, have dragged on for two decades. As is the case with relicensing controversies in other states, the dam's owners (first Montana Power Company and, since 1999, PPL-Montana) debated licensing conditions that required them to improve environmental conditions up- and downstream of the dam to compensate for disrupting aquatic environments.

Despite the seemingly irreconcilable differences between power companies and conservationists, however, the relicensing process can work. Recently, a coalition of citizens, corporate officials, and goverment agencies may have found a way for both the fish and the power to keep running strong.

CRAIG & LIZ LARCOM

CHARGED ISSUE: Dams store vast amounts of river water in reservoirs, releasing it (right) at key times to drive turbines that produce electricity. Though good for power generation, the dams disrupt natural flows on rivers such as the Clark Fork (left).

Rivers are naturally fluctuating ecological systems containing plant and animal life that has evolved over thousands of years. Dams disrupt those ecosystems by, in part, altering historic river level fluctuations. When dam operators need to increase electrical production—during the peak times in the morning when people arrive at work and in the evening when they return home—they release water to drive the energy-producing turbines. During times of low electricity demand, such as at night and on weekends, the dams hold water back, reducing downstream flows. This rapid fluctuation in river levels downstream can erode soil and vegetation. It can also strand fish in shallow pools suddenly cut off from the main channel.

Dams also block the downstream flow of sediment and nutrients, reducing fertility in the river below. And the structures cut off fish movement by preventing fish from swimming upstream to reach spawning tributaries. Unable to find adequate areas for reproduction, fish populations below dams often decline.

RON BOGGS

DAZED AND CONFUSED: Dams can stun or kill fish (such as these yellow perch below Canyon Ferry Dam) that pass through the turbines. The structures can also disrupt water levels downstream, flooding river channels at times or leaving them dry.

LICENSE TO SPILL

In the United States, privately owned hydropower facilities operate under 50-year licenses issued and administered by FERC, which operates within the Department of Energy. The commission is composed of five members appointed by the President of the United States, with the advice and consent of the U.S. Senate.

In Montana, many hydroelectric facilities were built in the first half of the 1900s to power the growing mining and logging companies and the communities that developed around them. The sole purpose of dams was to meet the state's ever-growing electrical demands. At the time, there was little concern over how the structures altered river ecosystems. In fact, little was even known about how dams affected fish. By 1954, when the Montana Fish and Game Department (as the agency was named then) employed its first fisheries biologist, most of the state's hydroelectric facilities had already been built.

During the latter half of the 20th century, however, citizens grew increasingly concerned that dams and other energy development were harming natural resources. They convinced lawmakers to pass state and federal laws to protect water, air, soil, fish, and wildlife. This legislation directly affected FERC's licensing processes. As many hydropower projects came up for relicensing in the 1980s and 1990s, power producers were, for the first time, required to reduce or offset (mitigate) the effects of their projects on fish and wildlife. Public natural resources management agencies such as Montana Fish, Wildlife & Parks set minimum standards for water quality, water flow, and fish passage that dams now must meet to reach modern standards for ecological health. Because rivers are public resources, the revised FERC relicensing process gives citizens some say in how dams are operated.

That's the theory, anyway. In practice, hydropower relicensing has not worked as well as Congress intended. The process was never set up to encourage collaboration and joint decision making. Conflicting views and positions were to be arbitrated by FERC staff members in Washington, D.C. Unfortunately, that process didn't work and often resulted in scenes of dueling experts and combatant lawyers. The FERC hydrorelicensing process became known for confrontation and litigation, which resulted in postponed benefits for the environment as well as costly operational delays and poor public relations for the power companies.

A NEW APPROACH

Like fish adapting to an altered environment, corporations must adjust to changing times if they hope to survive and thrive. Avista Corporation (formerly Washington Water Power Company) had closely watched the procedural train wreck of the Kerr Dam and other large relicensing projects nationwide. In 1992, faced with the upcoming relicensing in 2001 of two large hydroelectric dams, the company searched for a better approach.

"We looked around the country and saw

John Fraley is an FWP regional information officer at Kalispell. Joe DosSantos, a fisheries biologist who has worked for state and tribal conservation agencies, is currently employed by Avista Corporation.

BARBARA THOMAS

END OF THE LINE: River fish moving upstream to their spawning tributaries reach a dead end at dams, such as Kerr Dam at the outlet of Flathead Lake. Fish ladders allow for some upstream passage, but they don't work on many dams.

> "We looked around the country and saw that most relicensing projects were not going well."
>
> —Bob Anderson,
> *Director for Environmental Affairs,*
> *Avista Corporation*

that most ongoing relicensing projects were not going well," says Bob Anderson, Avista's director for environmental affairs. "We decided from the beginning that a teamwork process that involved all the affected groups would be the best way to go for everyone."

The two Avista dams were Noxon Rapids and Cabinet Gorge, both on the lower Clark Fork River in northwestern Montana. According to Montana and Idaho state fisheries officials and conservation group leaders, the company went beyond what any other had previously done to learn how those dams affected fish populations and what it could do to help. Before applying for a new permit, Avista first met with local citizens and consulted with state and federal natural resources agencies. The company eventually brought in representatives of more than three dozen interests, ranging from federal agencies like the U.S. Fish and Wildlife Service to local groups such as the Elk Creek Watershed Council. Everyone was given an equal seat at the negotiating table. Then the company hired several consultants experienced in conflict resolution to facilitate meetings and help the group reach consensus. Avista also invited a high-level regional FERC official to attend key meetings and answer questions.

Providing some additional incentive for Avista's cooperative approach was the looming threat of the federal Endangered Species Act. Bull trout were listed as a federally threatened species in 1998. The fish live in the Clark Fork River, and the two dams block their historic migratory routes as they leave Idaho's Lake Pend Oreille and swim upstream to find spawning tributaries.

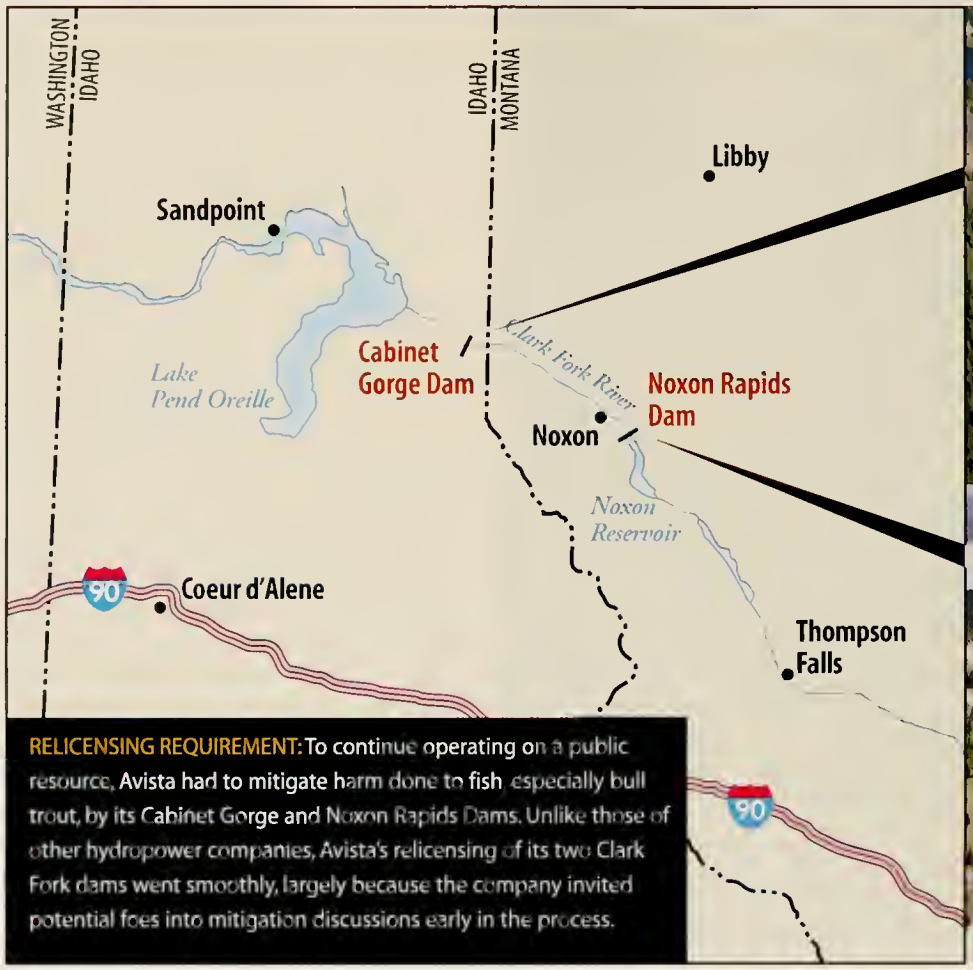
It wasn't just the federal stick that kept the process moving, however. Another key move by Avista was to work early on with the local chapter of Trout Unlimited, which otherwise might have become an adversary. "They came to us and asked us to be involved," says Bob Dunnagan, Idaho Trout Unlimited Panhandle Chapter president, who represented the conservation group during the relicensing process. "I think [this collaborative process] is a good example of how private industry, nonprofits, government, and other groups have been able to work together for the betterment of fish."

Avista even went so far as to convince Trout Unlimited's chief legal council in Virginia—an individual who could have become the company's worst nightmare—to become a partner in the relicensing process.

"I'd never heard of any company doing that before," says Chris Hunter, head of Montana FWP's Fisheries Division. "I think that had a lot to do with how well

JOHN LAMBING

SERIOUS THREAT: Once bull trout were listed as a federally threatened species in 1998, dam operators had to take into account how their facilities affected the fragile fishery.



RELICENSING REQUIREMENT: To continue operating on a public resource, Avista had to mitigate harm done to fish, especially bull trout, by its Cabinet Gorge and Noxon Rapids Dams. Unlike those of other hydropower companies, Avista's relicensing of its two Clark Fork dams went smoothly, largely because the company invited potential foes into mitigation discussions early in the process.

MAP ILLUSTRATION BY *MONTANA OUTDOORS*/PHOTOS BY AVISTA CORPORATION

and how quickly things moved along."

The collaborative approach worked. Unlike the Kerr Dam and other lengthy relicensing controversies, the Noxon Rapids and Cabinet Gorge relicensing moved along quickly. It took only three years for participants to arrive at what was called the Clark Fork Settlement Agreement.

"When we first started talking about this," says Hunter, "I thought it would be impossible to get 30 groups to agree on anything. But I've been amazed at how well it worked."

Hunter says he's also been amazed at how FERC relicensing in Montana has continued to improve.

"The Kerr Dam process was unwieldy and took 20 years," he says. "Montana Power Company [now PPL-Montana] learned from that and completed the Missouri River hydropower dams relicensing in eight to ten years. Now with this project, accomplished in less than three years, Avista has taken the process even further."

Hunter adds that Avista's two Clark Fork dams were the nation's first large, modern hydropower projects actually relicensed by FERC on schedule. "All others have bogged down to some degree in red tape and controversy," he says.

BULLS GET A BOOST

What did Avista agree to do in return for its reauthorized license? On many dams, the key issue with relicensing is for the owners to change the way they operate the facility. Fish proponents want dams to release and hold back water to more closely replicate natural river flow fluctuations.

Noxon Rapids and Cabinet Gorge Dams, however, don't store much water. The main issue there was that the dams block off cutthroat trout and especially bull trout from moving upstream from Lake Pend Oreille.

"What the whole process got down to," says Hunter, "was how Avista was going to mitigate that."

The core element of the agreement was that Avista would fund fisheries programs in northern Idaho and northwestern Montana to benefit whitefish and native trout, especially the threatened bull trout. For example, biologists with Montana FWP, the Idaho Department of Fish and Game, and the U.S. Fish and Wildlife Service teamed up with the power company to buy and restore key tributary habitat, including 871 acres in Montana's Bull River drainage and 216 acres of tributary habitat in Idaho. More habitat acquisitions are planned.

Avista, state, and federal biologists are also conducting a wide range of research projects to learn more about bull trout survival and habitat needs. And they are monitoring fish populations to see how the species is faring from year to year.

Some fish are getting a free ride over the dam to spawning sites. During the past two years, biologists have netted, radio tagged, and transferred 68 adult bull trout over Cabinet Gorge Dam—the first time the species had made its way upstream since the dam was completed in 1952. Some of these bull trout moved even farther upstream from their release site and spawned successfully, encouraging biologists to consider expanding the dam-hopping effort this spring.

PHOTOS BY AVISTA CORPORATION

MAKING AMENDS: Avista has begun mitigating disruptions to bull trout populations on the Clark Fork River by conducting research, buying habitat, transporting fish, and funding educational programs and materials. Currently the company has 21 staff members working on bull trout projects. Above left: Avista biologists surgically implant a radio transmitter into an adult bull trout. By following the fish with radio receivers, they will be able to learn more about where bull trout go to spawn, spend the winter, and avoid flood waters. Above right: During the past two years, biologists have netted and transported 68 adult bull trout over the Cabinet Gorge Dam to help the fish reach spawning tributaries.

> "I thought it would be impossible to get 30 groups to agree on anything."
>
> —Chris Hunter
> *Administrator,*
> *Montana FWP Fisheries Division*

Another part of the agreement has been to increase enforcement to prevent bull trout poaching. It's illegal to keep a bull trout caught from the Clark Fork, its tributaries, or Lake Pend Oreille. Game wardens in Montana and Idaho have beefed up patrols and surveillance (using video cameras purchased by Avista) of spawning sites to discourage illegal fishing. Game warden Tom Whalen, who patrols the Pend Oreille basin in northern Idaho, says most anglers know which fish are bull trout and that it's illegal to keep them. Anglers caught with a bull trout usually say they thought it was a different, legal trout species.

"The bottom line is that most people are obeying the regulations," Whalen says. "I think this shows that all the education efforts are paying off."

Because angler ignorance can lead to inadvertent bull trout harvest, a key element in the restoration effort is increasing public information and education. As part of the agreement, Avista is paying to put in more bull trout information signs along the river. The company also funds radio public information announcements on how to identify bull trout and pays for bull trout information websites, education materials, school presentations, and county fair booths.

The educational efforts reduce illegal harvest and also increase public awareness about bull trout life history and habitat needs. What's more, they help people understand how to identify the species and make clear how land use and other human activities can harm bull trout.

Chris Crane, an FWP technician and aquatic educator at Thompson Falls, is among those working to teach kids about bull trout. He transports a trailer filled with bull trout information to fairs and other events. He also takes elementary school students fishing and aquatic insect collecting, all the while teaching them about the need to conserve bull trout, other native fish, and aquatic habitat.

Meanwhile, in Idaho, Maria Corsini has been helping spread the word about bull trout conservation by building information kiosks, speaking at county fairs, and talking to river and reservoir users.

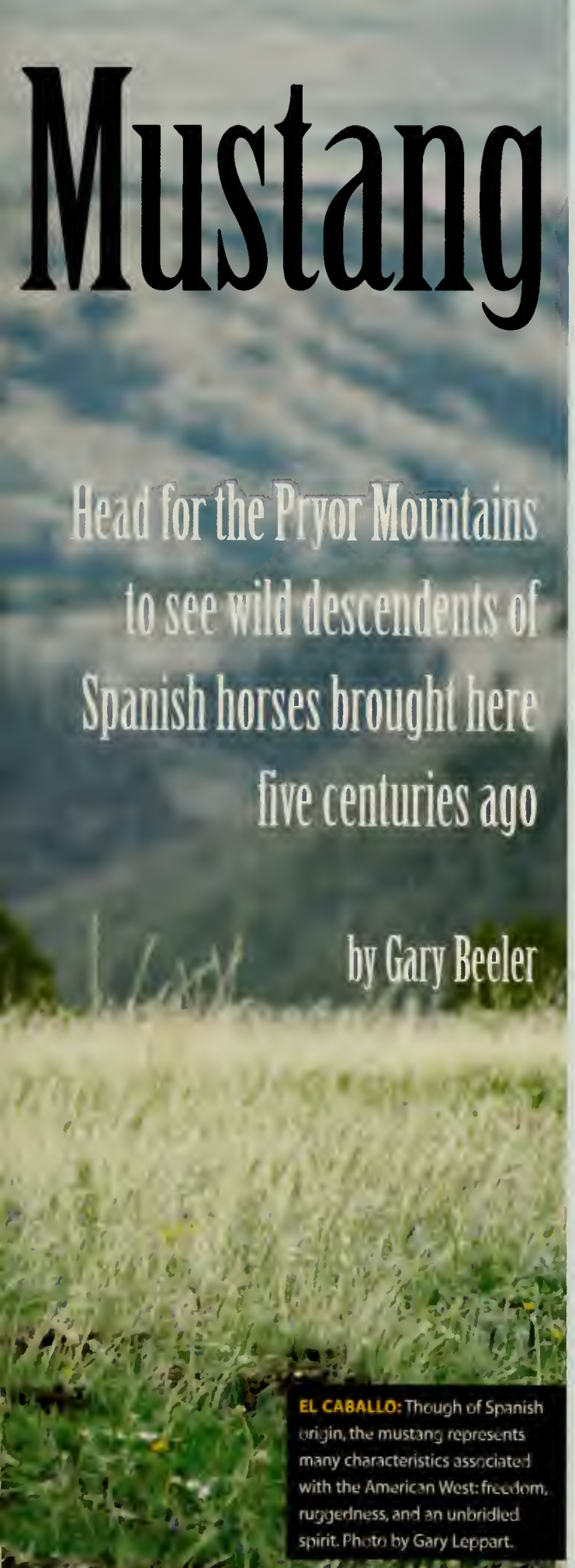
"We know we are reaching people," says Corsini, education coordinator for Idaho Trout Unlimited. "Most are now aware of what we're trying to do to conserve bull trout."

Admittedly, informational signs and kiosks can't compensate for how dams have disrupted fish migrations, and research and habitat acquisition won't restore bull trout populations to historic levels. But if people want hydropower, then perhaps the compromise struck by Avista and conservationists represents the best way to keep both electricity and the river flowing with the least disruption possible.

Mustang Sally

Head for the Pryor Mountains to see wild descendents of Spanish horses brought here five centuries ago

by Gary Beeler



EL CABALLO: Though of Spanish origin, the mustang represents many characteristics associated with the American West: freedom, ruggedness, and an unbridled spirit. Photo by Gary Leppart.

My efforts to slip quietly along the juniper-studded gully proved in vain as the wild horses turned to watch my clumsy approach. I paused behind a craggy juniper, hoping to be forgotten as the harsh wind blew my scent away, but no such luck. The magnificent black stallion moved toward his harem and stood guard, nervously awaiting my next move.

Knowing that I had to be closer for a good shot, even with a telephoto lens, I tried a trick that helps when photographing moose. I strolled into the open and simply sat down. After several minutes, as the frost from the ground began to work up my spine and my fingers turned to frozen sticks, I began to sing softly to the horses. My renditions of *Red River Valley* and *Clementine* have, in the past, calmed nervous moose, and the same was true with the mustangs. Maybe they assumed (correctly) that anyone goofy enough to sit on the frosty ground and make funny noises doesn't have enough gray matter to be dangerous. But for whatever reason, they seemed to accept me. A sorrel mare lay down, accompanied by her black colt. The stallion and two other mares resumed grazing, nibbling at sparse blades of dried grass. Delighted with my first introduction to the wild horses of the Pryor Mountain Wild Horse Range, I sat and mentally reviewed what I knew about the horses and their rugged, mountainous home.

The Pryor Mountain wild horses are of Spanish descent, still showing many features of the traditional European Spanish horse. Their ancestors, domesticated Spanish wild horses, were brought to North America five centuries years ago by the conquistadors. Later, American Indians and then settlers began using the horses, which became a fixture of western life. Because horses tend to roam when not well tended, many escaped confinement and spread across the West. By the mid-1800s, an estimated 2 million horses, which had now become wild, ranged the western grasslands from Mexico to Canada. The Pryor Mountain herd, possibly strays from migrating bands of Crow or Shoshone Indians, has been around since the late 1800s (written accounts from trappers in the area before then make no reference to the animals). The horses' features show traces of their Spanish lineage. They are small, about 14 hands high, and have a narrow, deep chest and a short, strong back. Their colors vary, ranging from black, brown, and bay to gray, dun, and blue roan. Some are unusually marked with zebra stripes on the legs and with a black dorsal stripe running down the

MATT ALLAIN

NOT WILD ENOUGH: Biologists don't consider wild horses as wildlife and maintain that the feral livestock compete with native mule deer and bighorn sheep for scare grasses and forbs.

back. The horses are extremely hardy, able to survive the frigid winters and dry, scorching summers on the range that was set aside for them in 1968.

That was when Interior Secretary Stewart Udall designated the 31,000-acre tract along the Montana–Wyoming border as the nation's first wild horse preservation site. The federal Wild and Free-Roaming Horse and Burro Act, passed in 1971, protects wild horses and burros and makes the Bureau of Land Management (BLM) responsible for the animals.

GRAZING COMPETITION

Not everyone is in favor of protecting wild horses, however. Before federal protection, the animals were sometimes shot for sport and left to rot. Others were rounded up and sold to canneries for dog food or human consumption. Charlie Eustace, recently retired Montana Fish, Wildlife & Parks regional wildlife supervisor at Billings, explains that some people consider the horses pests or oddballs that are neither domestic nor game animals. Wildlife advocates and biologists contend that the horses, which are grazers, compete with native mule deer and bighorn sheep for limited grasses and forbs.

"They are a relatively new addition to the area," says Eustace, "so they make it that much harder for native wildlife to compete for food."

Eustace adds that the horses continue to range north from their established range onto U.S. Forest Service lands allotted for grazing. "That doesn't sit well with ranchers up there trying to graze their cattle," he says.

John Adams of the Montana Wilderness Association points to another potential problem: efforts by local communities to promote wild horse viewing. That, he says, could lead to more paved roads and motorized traffic into the Pryor Mountains, which environmentalists hope to see designated as a national wilderness area.

For their part, wild horse advocates maintain that mustangs are well worth promoting. They say the horses have become just as naturalized to their wild surroundings as ring-necked pheasants and brown trout—two other species not found in Montana 150 years ago yet today are highly esteemed. Members of the Wild Horse and Burro Freedom Alliance say the horses do far less harm to grasslands than cattle, live isolated in a tiny footnote of the state, and are prevented from overpopulating their range with periodic culling by the BLM.

The Pryor Mountain Wild Horse Range is bounded on the east by the Bighorn Canyon, on the west by Crooked Creek, and on the north and south by fences. The land slopes up from the south to the north, from roughly 3,640 feet to more than 8,000 feet in the high mountains, and is laced with deep, rugged limestone canyons. Much of the range is rocky outcrop.

Like much of the region, the weather here is harsh, ranging from blazing prairie heat to deep snow and freezing temperatures on mountaintops. The entire area is parched: Yearly average rainfall ranges from just 5 inches in the low foothills to no more than 20 inches along the high canyons.

The area's vegetation is as diverse as its weather. Alpine fir, grasses, and sedges grow along the upper ridges and prairies, while the middle elevations are graced with stands of limber pine and Douglas fir interspersed with open meadows of grasses, forbs, and sagebrush. At lower elevations vegetation is sparse, except along Crooked Creek, where broad-leafed shrubs such as golden current and wild rose thrive.

The horses move throughout the region in search of water and food. During much of the year they stay near springs in the lower elevations, though in summer they often head uphill to subalpine meadows, where they find grasses and forbs, as well as several reservoirs.

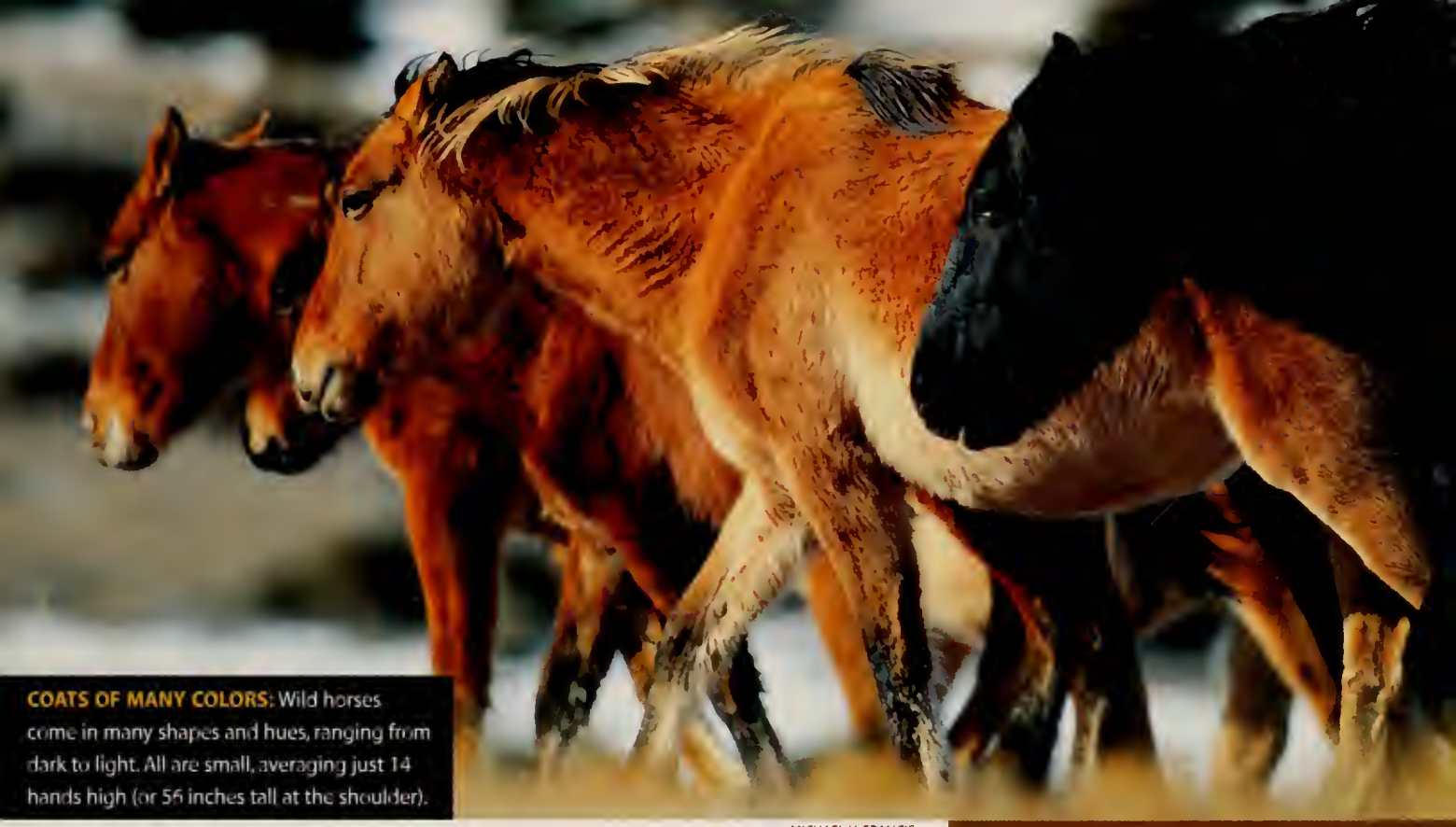
HORSE HAREMS

Roughly 120 to 160 wild horses live in the range, producing 20 to 30 foals every

BLACK BEAUTIES: Wild horse fans contend that the animals, though not native, are naturalized and merit the same respect given to other wild exotics such as the ring-necked pheasant and the brown trout.

GARY LEPPART

Gary Beeler is a writer and photographer from Boyd.



COATS OF MANY COLORS: Wild horses come in many shapes and hues, ranging from dark to light. All are small, averaging just 14 hands high (or 56 inches tall at the shoulder).

MICHAEL H. FRANCIS

spring. Each of the 30 or so harems contains a dominant stallion and a lead mare. The stallion wards off threats, but it is the lead mare that moves the harem to water and food or away from danger. Moving about the range and staying on the fringe of the harems are small groups of colts, called bachelor stallions, which have been kicked out of their fathers' harems. Until they gain the size and maturity to acquire their own mares, these colts stick together, sparring with each other to polish their fighting skills.

Because the mustangs have few natural enemies (primarily mountain lions and bears) and cannot be hunted, the Pryor Mountain population could quickly grow too large for the available habitat. Periodically, BLM staff members round up the herd (an activity called a gather) to selectively remove some individuals and draw blood samples on others to monitor genetics and health. The horses selected for removal are offered for adoption. Adopted horses are used as companion animals or simply to add a western touch to someone's private property.

Recently, the BLM began looking at new ways to improve herd health and keep mustang numbers under control. During the last gather in 2001, young mares were given a contraceptive vaccine, rendering them infertile for one year. Not only did this lower the horses' birth rate, but by giving the mares a chance to grow older before conceiving, it allowed them to produce healthier foals.

CATCHING SIGHT OF ONE

Spying a wild horse in the Pryors isn't impossible, but it requires some effort. The most accessible of the three roads where mustangs might be seen is the Bad Pass Highway, a paved two-lanet in the Bighorn Canyon National Recreation Area, best reached from Lovell, Wyoming. From this highway, go west to the Sykes Ridge Road or the Burnt Timber Road, both of which head north up into the Pryor Mountains.

Horses aren't the only critters around. Bighorn sheep, elk, mule deer, and black bears also live in the Pryors, as do more than 200 bird species, including golden eagles, blue grouse, and peregrine falcons. Several species of bat hang around the limestone caves, and cutthroat trout can be seen darting into the shadows of Crooked Creek. If fishing along the brushy, rocky creek, listen for the warning buzz of rattlesnakes, which are abundant throughout the Pryors. Help can be a long ways off, and, unlike the wild horses, the snakes can't be pacified by song.

IF YOU GO

The Pryors are rough, remote mountains. A four-wheel drive is the preferred vehicle, but to really experience the place it's best to get out and hike. Summers can be beastly hot and winters deadly cold, so dress appropriately. And remember that the temperatures can change from hot to cold, or vice versa, in minutes. Bring plenty of water no matter what the season.

For more information about the Pryor Mountain Wild Horse Range, including the BLM's map of the Pryor Mountain area, write or call the Bureau of Land Management, Billings Field Office, P.O. Box 36800, 5001 Southgate Drive, Billings, MT 59107; (406) 896-5013.

PHIL HANDES

Letters from page 2

by the Montana Natural Heritage Program (http://nhp.nris.state.mt.us/mbd/), which shows that common goldeneyes have been observed breeding in much of western Montana. But according to Jeff Hebert, head of Montana FWP wildlife research and previously the agency's waterfowl migration coordinator, that doesn't mean the species is a regular Montana nester. "Some common goldeneyes do breed here," he says, "but from a population standpoint, the vast majority nest north of Montana." So it appears I erred and should have written, "The common goldeneye generally *does not breed in Montana...."*

Regarding your recent article on the supposed need to hunt (kill) problem or "excess" grizzly bears ("On the Front Lines," Nov./Dec.): Why are lethal bullets seen as a better solution than aversive conditioning with pepper spray, cracker shells, and trained bear dogs? Clearly, a dead grizzly can not learn a valuable lesson, nor can it teach its offspring how to avoid humans. Some traditions in the West can and should change.

MARY JANE BARRETT
Kalispell

Little common ground on grizzlies

Regarding the grizzly hunting ban in Montana: What a sad state of affairs wildlife management is in when the likes of The Fund for Animals can dictate what trained biologists can do. We have a similar problem here in Wisconsin with too many wolves and a ban on hunting them. They are killing hunting dogs and cattle at a very dangerous rate. I think we are going ro be forced into practicing the Three S's: shoot, shovel, and shut up.

G. W. SUTHERLAND
Broadhead, WI

You likely received plenty of suggestions on grizzly bear management following publication of the article "On the Front Lines." Here is another to throw into the mix: Why not auction off a certain number of grizzly hunting permits each year? That way you could remove only the nuisance bears without disturbing the balance between the grizzly population and the existing habitat. Each hunter would be supervised by a Montana FWP biologist. That way the bears actually causing problems would be removed. In addition, monies obtained by the auctions could then go to FWP programs.

GARY YAKER
Tampa, FL

FWP GRIZZLY BEAR BIOLOGIST MIKE MADEL RESPONDS: *No group dictates what this agency does, but lawsuits can restrict our activities. Aversive conditioning can work, and we use it often, but it doesn't always deter bears. As the grizzly population grows and spreads farther outside the recovery area, aversion will become even more difficult to employ.*

The auction idea might be one to consider down the road. But for now, Montana has no authority to allow for grizzly hunts of any kind, because the bear is on the federal Endangered Species List. For the grizzly to be removed and full management authority to revert back to the state, the U.S. Fish and Wildlife Service states in its recovery plan that it needs better data showing adequate population growth and that there will be no net loss of habitat. We're working on providing that data, but it will take time.

Nonresident fees, cont.

I have hunted in your state for many years for everything from elk to birds. I have made many friends and look forward to seeing them each year.

My concern is that you seem to be placing the maintenance of your budget on the backs of nonresident hunters. The disparity between the resident and nonresident fees and opening dates is unfair. I am willing to pay my way, but please level the playing field.

BRUCE W. LINDBERG
Andover, MN

■ We welcome your comments, questions, and letters to the editor. We'll edit letters as needed for accuracy, style, and length. Mail your letter to: Montana Outdoors, P.O. Box 200701, Helena, MT 59620-0701. Or e-mail us at: tdickson@state.mt.us

Outdoors Report from page 5

Another way to open access

DONALD M. JONES

The New York Times recently reported on a new program in that state which helps farms with marauding deer while also providing access to private land for qualified hunters. To qualify for the Deer Management Partnership, hunters must go through a rigorous training and testing program that requires expert marksmanship and impeccable ethical behavior. In return, hunters are allowed to hunt deer on land previously posted to no hunting. Littering, dangerous shooting, or other bad behavior are not tolerated. With a single complaint from one farmer, the paper reports, a hunter can be expelled from the program.

The Montana Fish, Wildlife & Parks Foundation raises funds to provide critical private support for FWP in its stewardship of the fish, wildlife, parks, and recreational resources of Montana.

MONTANA FISH, WILDLIFE & PARKS FOUNDATION

The foundation accepts individual and corporate gifts and assists in designing planned gifts to fit individual needs.

For more information, visit the foundation website at: *fwp.state.mt.us/foundation*
or e-mail: *fwpfoundation@state.mt.us*
or call: (406) 444-6759.

Ponderosa Pine
(Pinus ponderosa)

Probably more picnics have been held in the shade of Ponderosa Pine than any other western tree," writes John Kircher in *Ecology of Western Forests.*

That's a safe bet. For one thing, the ponderosa is the most widely distributed and one of the most abundant trees in the West. For another, ponderosa pine forests are usually open, parklike areas with lots of room for picnicking. Not only are the forests lovely places, but the trees themselves are stately and beautiful. Named for its ponderous size, this pine has a strong, tall trunk topped by an open, irregularly shaped crown. To lunch beneath a stand and then fall asleep afterward in a bed of needles, the smell of vanilla wafting down from the sun-warmed bark, is to experience one of life's great pleasures.

RANGE: The ponderosa pine dominates western North America, from central British Columbia south to central Mexico, west to the Pacific Ocean and east to South Dakota's Black Hills. It typically grows on semiarid plateaus and slopes, often surrounded by juniper and sage.

SHAPE: Pyramidal when young, the ponderosa pine gradually loses low limbs as it grows taller. Mature trees are tall with a large, irregular crown.

IDENTIFICATION: Mature ponderosa pines are easy to identify by their orange-brown bark, which appears as large plates that look like gigantic jigsaw puzzle pieces.

TIM EGAN

LEAF: The needles are 5 to 10 inches long and usually grow in bunches of three.

SMELL: When crushed, the needles smell of turpentine and citrus. On hot days, the bark of adult trees can smell like vanilla.

CONES: Oval shaped, 3 to 6 inches long, red-brown in color with a stiff prickle on the end.

AGE: Up to 600 years.

SIZE: Mature trees average 100 to 150 feet tall but can reach 230 feet in height.

ASSOCIATED WILDLIFE: Birds love ponderosa pine forests. Look for western tanagers, chipping sparrows, and mountain bluebirds as well as northern flickers, Steller's jays, great horned owls, and bird hawks such as the sharp-shinned and Cooper's. Mammals ranging from golden-mantled squirrels to grizzly bears frequent ponderosa pine parks.

BERT GILDART

ROOTS: Ponderosa pine taproots can go down 30 feet to reach deep moisture. The root system can spread 100 feet from the trunk.

FIRE: Ponderosa pines thrive in sunlight and require periodic fires. Historically, low-intensity fires caused by lightning or set by Indians burned every few decades and killed competing species that shaded out young ponderosa pines. Older ponderosa pines were protected by their thick bark. As fires have been suppressed, ponderosa stands have become crowded with mature trees competing for limited nutrients and moisture. Young ponderosa pines are then shaded out. Throughout many western states, including Montana, ponderosa pine stands have been taken over by more shade-tolerant species such as the Douglas fir.

WOOD: Knotty but clear and even grained, the ponderosa pine is used for doors, windows, furniture, paneling, and shelving.

HISTORY: American Indians traditionally ate the seeds and inner bark, dug out logs for canoes, and used the pitch as waterproofing and ointment. The ponderosa pine was designated as Montana's official state tree in 1949.

— TOM DICKSON

DONALD M. JONES

NATIONAL WILDLIFE REFUGES CELEBRATE A CENTURY OF CONSERVATION

Each spring sagebrush ecosystems across eastern Montana resonate with a loud, liquidy "plopping" sound as male sage grouse display on mating areas, called leks, to attract females. The birds produce the sound by forcing air from two large pouches on either side of their neck, creating what sounds like catsup being poured from a gigantic bottle.

One place to experience this fascinating display is at an eastern Montana national wildlife refuge such as UL Bend, located 50 miles south of Malta, where this photo of 11 amorous sage grouse males was taken.

Another reason to visit a national wildlife refuge is to join in celebrating the refuge system's 100 years of conservation. On March 14, 1903, President Theodore Roosevelt created the nation's first national wildlife refuge, 5-acre Pelican Island in Florida. Over the past century, that small conservation effort has grown to become the world's largest network of lands and waters dedicated to protecting and managing wildlife.

America's national wildlife refuge system now encompasses more than 95 million acres on more than 540 refuges and thousands of waterfowl production areas.

Montana contains 21 national wildlife refuges: Benton Lake, Black Coulee, Bowdoin, Charles M. Russell, Creedman Coulee, Hailstone, Halfbreed, Hewitt Lake, Lake Mason, Lake Thibadeau, Lamesteer, Lee Metcalf, Lost Trail, Medicine Lake, National Bison Range, Ninepipe, Pablo, Red Rock Lakes, Swan River, UL Bend, and War Horse.

In addition to sage grouse, Montana's refuges are home to bison, wolves, elk, deer, black-tailed prairie dogs, trumpeter swans, piping plovers, and most resident and migrant waterfowl and shorebird species.

"If you've never visited a national wildlife refuge before, this is the year to get out and see how wonderful these areas are," says Deserai Anderson-Utley, a U.S. Fish and Wildlife Service public affairs assistant.

Montana's state highway map shows all the refuges, but for specific information go to refuges.fws.gov on the Internet and click on "Site Map" then "Addresses, refuge," and then type "MT" into the stare box.

03
7 44040 88810 4